

NATIONAL POSTGRADUATE MEDICAL COLLEGE OF NIGERIA



PAEDIATRIC ANAESTHESIA CURRICULUM

FACULTY OF ANAESTHESIA

APPROVED BY THE SENATE ON 5TH DECEMBER, 2024

A handwritten signature in blue ink, appearing to read 'F. A. Arogundade', is positioned above the name of the Registrar.

**DR F. A. AROGUNDADE, MD FMCP
COLLEGE REGISTRAR**

FACULTY OF ANAESTHESIA
NATIONAL POSTGRADUATE MEDICAL COLLEGE OF NIGERIA
CURRICULUM FOR PAEDIATRIC ANAESTHESIA SUBSPECIALTY
(FELLOWSHIP AND DOCTOR OF MEDICINE PROGRAMMES)

i) MD Programme: Doctor of Medicine, Paediatric Anaesthesia. (MD, Paediatric Anaesthesia)

ii) Fellowship Programme: Fellow of the Medical College in Anaesthesia (Paediatric Anaesthesia).

A) INTRODUCTION

Forty three percent (43%) of Nigeria's 223M population are children under the age of 14 years (*United Nations Population Division. World Population Prospects: 2022 Revision*). The trend of childhood mortality in low- and middle-income countries is changing from infectious diseases to congenital diseases and trauma. It is therefore expected that more children will require anaesthesia necessary for elective and emergency procedures. Workforce densities for the region for physician anaesthetists and sub-specialised paediatric anaesthetists is extremely low. The peri-operative mortality of children in Sub Saharan Africa is high due to numerous reasons, one of which is lack of specialized peri-operative care. Furthermore, the numerous childhood cancers, and better diagnostic techniques and therapeutic interventions available require the provision of specialized paediatric sedation and analgesia services. Thus, the need for sub-specialisation training in paediatric anaesthesia has been recognized by the National Postgraduate Medical College of Nigeria to produce specialists who are competent at providing safe peri-operative and critical care for children.

Paediatric anaesthesia covers the widest physiological range of patients from pre-term babies to adolescence and a wide range of surgical specialties. This makes it a unique sub-specialty. This sub-specialisation training in paediatric anaesthesia is directed at preparing the candidate for providing complete peri-operative care for most children including pain management and sedation techniques. The training will build on the basic principles of paediatric anaesthesia learned during the early part of residency training.

The training will provide ample opportunities to gain skills in the peculiarities of children; anatomical, physiological, pharmacological, and psychological as well as provide safe conduct of anaesthesia, sedation and adequate post-operative pain relief.

B) PHILOSOPHY

The goal of the one year training in paediatric anaesthesia is to enhance the knowledge and skills acquired during this period to enable the candidate independently provide peri-operative management of a paediatric patient at an advanced level. At the end of this training, it is expected that the candidate

will have gained knowledge, skills, and competencies to manage simple and moderately complex procedures in healthy and compromised children. The candidate is also expected to acquire resuscitation and critical care skills and develop research competencies in children.

Appropriate attributes (communication skills, inter-personal skills as well as professionalism) to deal with children and their parents are expected to have been attained.

C) AIM AND OBJECTIVES

Aim

The Aim of the training is to produce a specialist in peri-operative and basic critical care management of the paediatric patient.

Objectives

1. To demonstrate knowledge, skills, and competencies in providing effective and appropriate patient-centered care that is current, professional, ethical, and empathetic for the challenges of and the promotion of peri-operative medicine in the child.
2. To demonstrate a good understanding of established basic and clinical sciences, epidemiology, and social-behavioral sciences, and their application to paediatric care.
3. To demonstrate the ability to investigate and evaluate the care of paediatric patients and to appraise and assimilate scientific evidence relevant to paediatric patients.
4. To demonstrate the ability to continuously improve the standard of patient care through self-evaluation and life-long learning.
5. To demonstrate appropriate communication skills required to deal with children of all ages and their parents.
6. To develop appropriate competencies to act as a trainer in paediatric anaesthesia.

D) ENTRY REQUIREMENTS - general for all subspecialties

1. Fellowship Route: Part 1 Fellowship of the Faculty of Anaesthesia, NPMCN.

- i) The candidate must have obtained the part 1 Fellowship of the Faculty of Anaesthesia, NPMCN. Having commenced the part 2 Fellowship training, the candidate should have undergone 24 months rotation through paediatric anaesthesia (especially neonatology), Intensive care, Obstetric anaesthesia, cardiothoracic anaesthesia, neuro-anaesthesia, regional anaesthesia and pain management. It is expected that Basic, Intermediate, and High level of paediatric anaesthesia experience would have been gained by this time. The remaining 18 months will be dedicated to advance training in paediatric anaesthesia.
- ii) The candidate is expected to register for sub specialization in paediatric anaesthesia within 6 months of passing the Part 1 fellowship examination.

iii) He/She must have submitted a proposal on a topic of a dissertation in the area of paediatric anaesthesia before commencing the sub-specialty training.

2. MD Programme: Candidates with the Part 1 Fellowship of the Faculty of Anaesthesia, NPMCN who have registered for the MD programme.

E) DURATION OF PROGRAMME

i. Fellowship Programme: Minimum of 36 months of which the last 18 months must be in the sub-specialty of paediatric anaesthesia.

ii. MD Programme: Six (6) semesters and six (6) months before the Part 2 Fellowship examination.

The training will be undertaken in an NPMCN accredited training institution in Nigeria. However up to 3 months of the training can be carried out in another accredited training institution within or outside Nigeria.

F. THE FIRST STAGE OF SENIOR RESIDENCY TRAINING

The duration of this stage is eighteen (18) months.

i. GENERAL EDUCATIONAL OBJECTIVES

This period must be spent in acquiring further knowledge in the subspecialties of Anaesthesia. During this phase of training, residents are expected to perform at a higher proficiency level than they did during their junior residency, to assume a greater degree of responsibility for decision making in patient care as well as cover a much wider scope of anaesthetic practice and procedures, e.g. neonatology. More opportunities are provided at this stage to enable each senior resident participate in teaching junior colleagues, nurses and medical students. He is also introduced to principles of health resource management in addition to problem solving skills as applied to research and anaesthetic practice.

ii. FORMAT OF TRAINING

- | | |
|---|----------|
| a) Cardiothoracic anaesthesia | 2 months |
| b) Intensive Care Medicine | 2 months |
| c) Neuroanaesthesia | 2 months |
| d) Obstetric anaesthesia and analgesia | 2 months |
| e) Paediatric (including neonatal) anaesthesia | 2 months |
| f) Pain Medicine | 2 months |
| g) Regional anaesthesia | 2 months |
| h) Anaesthesia for other surgical specialties-
(General Surgery, Urology, Orthopaedics & Trauma) | |

Maxillo-facial, Plastic & Reconstructive,
Ophthalmic, Otorhinolaryngology, Gynaecology) 4 months

iii. COGNITIVE SKILLS

Throughout the period of the Residency Programme, the Head of Department has the responsibility to expose the residents to a systematic schedule of didactic teaching covering the core knowledge pertinent to the practice of anaesthesia, so as to give them confidence and enable them to demonstrate good judgement in dealing with real problems.

This should be presented in form of seminars, tutorials and structured lectures, use of audio-visual aids, clinical case conferences, mortality and morbidity conferences, Information technology course, management course, teaching sessions, theatres and intensive care experience, journal reviews as well as research seminars. The Senior Resident must be updated from time to time on current opinions/research/practice of the specialty

The planned schedule should identify the scope of knowledge to be covered in cycles of 36 months and thereby provide opportunities for residents to cover the same ground at least twice; one as a junior resident and one as a senior resident.

iv. PSYCHOMOTOR SKILLS

Each training institution should design its programme in such a way that the resident's acquisition of requisite anaesthetic skills spans over the 5 year (Junior and Senior Programmes) period. The mastery of specific psychomotor skills of increasing degree of complexity, such as stated below should be emphasized.

- (a) The handling and care of anaesthetic machines and auxiliary equipment, storage of gases, safety devices.
- (b) The organization, disinfection and sterilization of auxiliary anaesthetic equipment appropriate for a particular technique of anaesthesia.
- (c) The preparation and setting up of monitoring devices during anaesthesia and intensive care.
- (d) The preparation and positioning of patients for regional techniques and particular operations.
- (e) Participation in the prevention of explosion and fire in the operating room.

v. RESEARCH SKILLS

The head of department in the training institution should encourage residents to cultivate the habit of systematic clinical problem solving, featuring observation, interpretation, deductive reasoning, and decision-making followed by further observation. These are basic requirements for competence in

research, either in the context of clinical problems or basic research projects. Periodic departmental research seminars are recommended as the forum in which young researchers present their project for discussion, and receive the criticism and guidance of their teachers and peers.

vi. COMMUNICATION SKILLS

It is important that Consultant Anaesthetists should be effective communicators not only in the ordinary run of clinical practice dealing with anxious patients, medical records documentation, or case presentation; but also in the context of scientific conference presentation, scientific journal publication, and indeed examination writing. Therefore training institutions must provide opportunities for the acquisition and testing of various levels of communication skills.

Computers have become important tools in all spheres of anaesthetic practice such as drug prescription, equipment for diagnosis and treatment, anaesthetic machine and others. Record keeping and auditing are also computer based. The knowledge of computer in anaesthesia is relevant in communication skill and should be stressed at this level. This should include literature search, use of internet, the use of statistical software, simulation and Microsoft Power Point for presentations.

vii. CONTACT HOURS AND CREDIT UNITS FOR THE FIRST STAGE OF SENIOR RESIDENCY TRAINING– 18 MONTHS

In addition to the curriculum outline for the Junior Residency training programme, the Senior Residency Curriculum is advanced with further knowledge of the subspecialties in Anaesthesia, Pain Medicine and Intensive Care.

Specialties	Months	Contact academic (hours)	Theatre/ Clinical contact (hours)	Credit units
ANE 931. Cardiothoracic anaesthesia	2	30	180	6
ANE 932. Neurosurgical anaesthesia	2	30	180	6
ANE 933. Paediatric including neonatal anaesthesia	2	30	180	6
ANE 934. Obstetric Anaesthesia & Analgesia	2	30	180	6
ANE 935. Anaesthesia for other surgical specialties- General Surgery, Urology, Orthopaedics & Trauma, Emergency, Maxillofacial, Plastic &	4	30	180	6

Reconstructive Surgery, Ophthalmology and Otorhinolaryngology and Gynaecology				
ANE 936. Intensive Care Medicine	2	30	180	6
ANE 938 Pain Medicine.	2	30	180	6
ANE 939 Regional Anaesthesia	2	30	180	6
Total	18			48

viii (a). SKILLS TO BE ACQUIRED IN FIRST STAGE (18 MONTHS) SENIOR RESIDENCY TRAINING

	SKILLS	NUMBER REQUIRED TO BE PERFORMED
1	Intubation- routine	150
2	Intubation- nasal	13
3	Intubation- awake	5
4	Intubation- fiberoptic	5
5	Use of supraglottic airway devices	30
6	Difficult airway management	10
7	Double lumen tube insertion	7
8	Cricothyroidotomy	3
9	Percutaneous tracheostomy	3
10	Mini tracheostomy	3
11	Central venous cannulation	10
12	Intra-arterial cannulation	10
13	Intra-osseous cannulation	5
14	Peripheral venous cut-down	3
15	Subarachnoid block	50
16	Epidural block- lumbar	30
17	Epidural block- thoracic	1
18	Combined spinal-epidural block	20
19	Caudal block	25
20	Nerve blocks- brachial plexus, sciatic etc	10

21	Intravenous regional anaesthesia	10
22	Hypotensive anaesthesia	5
23	Total intravenous anaesthesia	5
24	One lung ventilation	7
25	Awkward positioning	25
26	CVP monitoring	5
27	Invasive blood pressure monitoring	5
28	Cardiac echocardiography	Observed/participated
29	Focused assessment for sonography (FAST)	Observed/participated

viii (b). OTHER RELEVANT SKILLS TO BE ACQUIRED IN THE FIRST STAGE (18 MONTHS) SENIOR RESIDENCY TRAINING

	SKILLS	NUMBER REQUIRED TO BE PERFORMED
1	Chest tube insertion	1
2	Ultrasound-guided vascular access	2
3	Ultrasound-guided nerve blocks	2
4	Critical care- initiation and weaning off ventilator	20
5	Critical care- arterial blood gas analysis	20
6	Critical care- sedation	12
7	Critical care- use of inotropes, vasopressors, syringe drivers and volumetric pumps	12
8	Critical care- cardiac output studies	Observed/participated
9	Critical care- cardioversion/pacing	2
10	Patient stabilization and transfer	8
11	Advanced Trauma Life Support Course	Attend 1
12	Cardiopulmonary resuscitation Course- adult/paediatric	Attend 1
13	Neonatal resuscitation	13
14	Chronic pain management	5
15	Epidural analgesia	3

Note:

- 1) The candidate must be able to manage complex surgical cases as itemized in each module
- 2) Each Candidate is expected to do a minimum of 30 hours of theatre/ clinical sessions per week throughout the 18 months of the first stage of Senior Residency period, taking into cognizance the period of annual leave.
- 3) A Senior resident is expected to attend at least two (2) local or international conferences and the certificate of attendance should be submitted with the examination application form
- 4) A senior resident must attain a minimum of 75% attendance at academic sessions. This must be duly signed up by the supervising consultant.
- 6) The candidate must provide a certificate of Training from a recognized CPR training programme within the 18 months of the first stage of the Senior Residency Training.

G. THE SECOND STAGE OF SENIOR RESIDENCY TRAINING (M.D. AND SUBSPECIALTY)

The duration of this second stage is eighteen (18) months.

LIST OF COURSES AND DETAILED COURSE DISCRIPTION

COURSE CODE	COURSE TITLE	DURATION (weeks)	LECTURES (hours)	PRACTICALS (hours)	CREDIT UNITS
ANE 943.1	Applied Basic sciences related to the paediatric anaesthesia	4	45	45	4
ANE 943.2	Pathophysiology of neonatal and paediatric medical and surgical conditions	4	45	45	4
ANE 943.3	Anaesthesia for the term and pre-term neonate	10	30	180	6
ANE 943.4	Paediatric Anaesthesia for General & Special Cases	10	30	180	6
ANE 943.5	Regional Anaesthesia and Pain management	10	30	180	6
ANE 943.6	Anaesthesia for Trauma and Acute Surgery	8	30	180	6
ANE 943.7	Paediatric Critical Care	8	30	180	6
ANE 943.8	Resuscitation Medicine & Emergency paediatric care	8	30	180	6
PMC 995	Advanced Research Methodology	1	30	-	2
PMC 996	Health Resource Management	1	30	-	2
ANE 999	Dissertation	8	90	270	12
#PMC 998	MD seminars	2	30	-	2
	TOTAL	72 (#74)			60 (#62)

For MD candidates

In addition to the listed courses above, candidates who are registered in the MD Programme will take the College Medical Education Course and Faculty Specialty-Based Courses as stipulated in each Specialty-MD curriculum.

H) DETAILED COURSES DESCRIPTION/COURSE CONTENT WITH SKILLS & COMPETENCIES

ANE 943.1: Applied Basic sciences related to the paediatric patient.

4 Credit Units

This course will ensure a good knowledge of the basics of physiology, anatomy, and pharmacology of the paediatric patient as well as the physical principles involved in anaesthesia equipment for children.

1.1. Anatomy: respiratory system: airway anatomy. Cardiovascular system: heart structure, great veins and arterial tree. Central nervous system; brain and the meninges, sacral canal, epidural space, subarachnoid space, plexuses and peripheral nerves, cerebral circulation. Anterior abdominal wall, diaphragm, foetal and transitional circulation.

1.2. Physiology: Cardiac- cellular physiology, Cardiac cycle, cardiac output and its determinants, cardiac failure, coronary circulation. Pulmonary – pulmonary circulation, physiology of ventilation, pulmonary mechanics, pulmonary function tests, blood gas analysis and acid-base balance, physiology of one lung ventilation, oxygen transport. Neurophysiology- neuromuscular junction, autonomic nervous system, determinants of cerebral blood flow and intracranial pressure, physiology of pain. Renal, hepatic, endocrine physiology, metabolic effects of surgery, body water and its maintenance, temperature regulation.

Blood physiology, blood coagulation

1.3. Pharmacology: Anaesthesia drugs: Premedicants, Intravenous induction agents, inhalational induction agents and factors affecting uptake of inhalational induction, maintenance agents, medications for emergence, muscle relaxants, analgesics, sedatives, anxiolytics, local anaesthetics, anticholinergics etc.

Drugs acting on the heart, lungs, vessels and other vital organs- bronchodilators, caffeine, anticonvulsants, corticosteroids, diuretics, beta-blockers, calcium channel blockers, antiarrhythmic agents, inotropes, vasopressors, cardiac glycosides, magnesium sulphate etc

Types of intravenous fluids and their compositions. Current concepts in antibiotic usage, nitric oxide,

1.4. Physics and Equipment: Gas laws, laminar flow, fluid dynamics.

Basic principles of anaesthesia monitoring, equipment, instruments, and consumables used in children. Invasive monitoring- intra-arterial blood pressure, central venous pressure, intracranial pressure, intra-abdominal pressure etc. Temperature and humidity measurement and monitoring. Anaesthesia breathing circuits- Mapleson F, Bain's Circuit, closed system

ANE 943.2: Pathophysiology of Neonatal and Paediatric Medical and Surgical conditions.

4 Credit Units

This course ensures a clear understanding of medical conditions common in children presenting for anaesthesia and their complications, management, and implications for anaesthesia. It enables a good understanding of the pathophysiology of surgical conditions presented for repair.

2.1 Sickle cell disease, asthma, seizure disorders, congenital heart disease, respiratory disease, diabetes, endocrine disorders, neuromuscular diseases, malnutrition etc and syndromes (Down's, Pierre-Robin), autism spectrum disorder etc.

2.2 Significant surgical conditions in children e.g., pyloric stenosis, omphalocele, gastroschisis, teratoma, biliary atresia, congenital diaphragmatic hernia, tracheo-oesophageal fistula, anorectal anomalies, adenotonsillar hypertrophy & post tonsillectomy bleeding, strabismus, retinoblastoma, neuroblastoma, congenital limb anomalies, cleft anomalies, hydrocephalus, meningomyelocele, patent ductus arteriosus etc

2.3 Pathophysiology of shock, hypothermia, sepsis, respiratory failure, persistent foetal circulation, malignant hyperthermia etc

ANE 943.3: Anaesthesia for the Term and Pre-Term Neonate.

6 Credit Units

This course is designed to ensure a good understanding of transitional circulation and identify neonatal concerns during anaesthesia. At the end of the course the candidate is expected to be able to provide anaesthesia for preterm and term neonates for a variety of surgical procedures

3.1 Age specific concerns for anaesthesia in the neonate- glucose homeostasis, temperature regulation, fluid therapy, pain assessment, neurobehavioral development, ventilatory modes etc

3.2 Appropriate assessment of neonates with congenital or metabolic disorders and liaise with other specialists for input.

3.3 Appraise and justify anaesthesia techniques for neonatal surgical procedures e.g., anterior abdominal wall defects, intestinal obstruction, sacrococcygeal tumours, tracheo-oesophageal fistula, diaphragmatic hernia, biliary atresia, conjoined twins, meningo-myelocoele, sacrococcygeal teratoma, circumcision etc.

ANE 943.4: Paediatric Anaesthesia for General and Special Cases.

6 Credit Units

This course is designed to enable the candidate compare, appraise, and justify anaesthetic techniques and management plans for general and special patient circumstances both elective and emergency. The candidate will revise a particular pathology in children and determine specific peri-operative management or recommend specialist input for optimisation. The course will explore difficult airway management in children with existing conditions that are likely to cause concern to the paediatric anaesthetist. It will also compare and determine the most appropriate anaesthetic management of known patient and familial conditions that may influence the choice of anaesthetic technique such as Duchenne's muscular dystrophy, central core disease, malignant hyperthermia and others as stated in 2.1.

4.1 Pre-operative Assessment and Preparation

4.1.1 Preoperative assessment and resuscitation of children for elective and emergency procedures- optimization, correction of fluid and electrolyte deficits, airway assessment, risk assessment, communication with child and parents, appropriate fasting guidelines, informed consent, and assent where applicable. Appropriate use of scoring systems and their implications in anaesthesia risk assessment- American Society of Anaesthesiologists' physical status classification, Surgical Risk Category, Glasgow Coma Scale, AVPU.

4.1.2. Appropriate request, interpretation and clinical application of laboratory investigations full blood count, haemoglobin electrophoresis, electrolytes, blood sugar, coagulation profiles, arterial blood gases, Liver Function Tests, radiological investigations (e.g. chest x-ray, CT scan, MRI), ECG, echocardiography, pulmonary function tests

4.1.3. Indications for and choices of anxiolysis including distraction techniques, parental presence, pharmacology of anxiolytic premedication.

4.1.4. Preoperative preparation of and understanding the anaesthetic implications of children with important medical conditions (e.g. sickle cell disease, asthma, seizure disorders, congenital heart disease, upper respiratory tract infection, neuromuscular disorders etc) and syndromes (Down's, Pierre-Robin, etc).

4.2 Principles of Peri-Operative Management

4.2.1 Inhalational Induction- techniques of induction (incremental or rapid), indications, contraindications, and possible complications. Intravenous induction- indications, contraindications, and possible complications. Pre-oxygenation, rapid sequence induction: indications and techniques,

4.2.2 Airway management – Indications, contra-indications, and complications of Supra-and infra glottic airway devices: oro-pharyngeal airway, nasopharyngeal airway, laryngeal mask airway, I-gel etc. Infra-glottic airway devices: tracheal tubes – types. Intubating aids – bougie, stylet, etc. Laryngoscopes; straight, curved, and hinged blades, video laryngoscope, fibre-optic bronchoscope. Surgical airway – tracheostomy, cricothyroidotomy. Laryngeal spasm: causes, presentation, and management. Extubation and Emergence- awake or deep extubation: indications and application, management of complications of extubation, use of neuromuscular junction monitoring.

4.2.3 Management of ventilation: spontaneous, controlled. Monitoring of ventilation; capnography, airway pressure. One-lung ventilation, ventilation during laparoscopic surgeries

4.2.4 Paediatric Equipment; Indications and uses of breathing systems-Mapleson F, Bains circuit, Closed circuit. Infusion giving sets: buretrol, volumetric infusers, syringe drivers.

4.2.5 Understand the principles of anaesthetic monitoring including paediatric peculiarities. Candidates must know the normal range of values for different paediatric age groups.

Monitoring: Invasive & Non-Invasive monitoring techniques of haemodynamics, oxygenation, ventilation, blood glucose, blood loss, temperature, and neuromuscular blockade for the peri-operative periods. Basic monitoring: heart rate, NIBP, SpO₂, ECG, ETCO₂, temperature, urine output. Invasive arterial blood pressure, Central venous pressure, intracranial pressure, cardiac output. Nervous System monitoring – Bi-spectral index (BIS), neuromuscular blockade with peripheral nerve stimulator and other advanced monitoring including cerebral oximetry, evoked potential monitoring.

4.2.6 Temperature control- fluid warmer, warming mattress, convection warmer, Heat and Moisture exchanger. Temperature monitoring- core and peripheral

4.2.7 Intravenous fluid management: maintenance and replacement fluids in various surgical procedures, indications for the use of special fluids. Blood loss assessment:-gravimetric, haemoglobinometer. Blood transfusion- indications for and appropriate use of blood components. Blood transfusion reaction -recognition, management, prevention. Massive blood transfusion

4.2.8 Postoperative Care - Pain assessment. Management of post operative complications, need for continued intubation and ventilation. Indications for HDU or ICU admission. Recognition, and management of residual neuromuscular block.

4.2.9 Anaesthesia for special paediatric conditions in infants and older children-biliary atresia, nephroblastoma, neuroblastoma, cleft lip and palate, adeno-tonsillectomy, ano-rectal malformations, strabismus, retinoblastoma, intracranial tumours, meningomyelocele, hydrocephalus, foreign body removal, urethroplasty etc

4.2.10 Recognition and management of critical perioperative events like bronchospasm, laryngospasm, anaphylaxis, cardiovascular collapse, malignant hyperthermia, inadvertent oesophageal intubation, and other tube-related problems.

ANE 943.5: Regional Anaesthesia and Pain Management in the Paediatric patient.

6 Credit Units

5.1 Pain management- pharmacology of analgesics appropriate for children- doses, routes of administration, indications, and contra-indications. Acetaminophen, opiates, non-steroidal anti-inflammatory drugs (NSAIDS), local anaesthetic agents.

Pre-emptive analgesia, multi-modal analgesia, analgesic ladder. Appropriate pain assessment scores for age, recognition, and management of side effects of pain medications.

5.2 Regional anaesthesia – Indications, contraindications, safe application, dose requirement for: caudal block, ilio-inguinal nerve block, lumbar epidural, transverses abdominus plane (TAP) block, rectus sheath block, brachial plexus block, sub-arachnoid block. Techniques of location of nerves - landmark, peripheral nerve stimulator and use of ultrasound.

ANE 943.6: Anaesthesia for Trauma and Acute Surgery.

6 Credit Units

The candidate would be able to summarise the acute physiological changes occurring in trauma and surgery and demonstrate the ability to apply available evidence to formulate appropriate treatment plans the neonate and the older child.

6.1 – Trauma – multiple injury, acute haemorrhage, burns, traumatic brain injury, spinal injury, limb injury, acute abdomen etc– assessment, resuscitation, imaging modalities, treatment strategies

6.2 – Use of fluids, blood products and haemostatic agents in trauma. Management of massive blood transfusion

6.3 - Acute surgical emergencies including foreign body aspiration, smoke inhalation

6.4 – Pain assessment and management in acute trauma

ANE 943.7: Paediatric Critical Care.

6 Credit Units

This course will enable the candidates to justify and choose treatment options when supporting the respiratory; cardiovascular; renal; neurological and immunological systems of neonates and children in the critical care environment. The unit will examine management techniques in neonatal intensive care for term and premature babies.

7.1 Children- Indications and criteria for ICU admission of children into the intensive care unit. Determine management goals/physiological parameters and targets for children requiring intensive care. Intensive care management of paediatric medical and surgical conditions e.g. respiratory failure, severe acute asthma, status epilepticus, sepsis, shock, burns, ARDS, infectious diseases, foreign body aspiration, poisoning, renal failure, coma, severe traumatic brain injury, polytrauma, tetanus, post-cardiopulmonary arrest, post-surgical care etc

7.2 ICU management therapies - Ventilatory support - Oxygen therapy, Indications for mechanical ventilation, Modes of mechanical ventilation, Weaning off mechanical ventilation. Cardiovascular support - Use of vasopressors, inotropes, IBP monitoring. Sedation, nutrition, renal replacement therapy in ICU. ICU scoring systems: pain, sedation, delirium, anxiety, prognosis. Infection control in the ICU. Appropriate antibiotic usage in the ICU. Goal directed therapy for children with sepsis. Transport of the critically ill child. Brain death and Organ donation

7.3 Neonates: Management of pre-term and term neonates with medical and surgical conditions. Indications and use of neonatal ventilators, Bubble CPAP, surfactant, caffeine.

Advanced respiratory organ support including high frequency oscillation and ECMO (extracorporeal membrane oxygenation) and their indications. Management of the neonate with apnoeic spells, neonatal sepsis, congenital heart diseases, neonatal jaundice etc. Other management strategies e.g. use of xenon in hypoxic ischaemic encephalopathy and treatment of meconium aspiration.

ANP 943.8: Resuscitation Medicine & Emergency Paediatric Care.

6 Credit Units

This course will enable the candidates to justify and evaluate current resuscitation guidelines in neonates and paediatrics. It will also revise current resuscitation guidance and enable candidates critique the evidence for recommended management at birth (eg delayed cord clamping, oxygen concentration used) and for cooling to prevent brain injury.

8.1 Principles of resuscitation; Basic Life Support (BLS), Neonatal Resuscitation (NNR), Paediatric Advanced Life Support (PALS), and appropriate post resuscitation care.

8.2 Hypoglycaemia, hypovolaemia, and shock: Recognition and appropriate management.

Management of trauma, head injury, burns and massive blood loss.

8.3 Management of acute severe asthma, status epilepticus, coma, intracranial hypertension, poisoning, anaphylaxis, near-drowning etc.

PMC 995. Advanced Research Methodology (College Course)

2 Credit Units

The main objective of this course is to facilitate acquisition of sound knowledge and necessary skills for research in anaesthesia. Definition, Spectrum and Types of Health Research Design. Defining Research problems, Setting Objectives, Statistics and Research Methods. Writing Research Proposals (Planning, Protocol Development and Report Writing) Good Clinical Practices and Clinical Trials. Role of Computer in Medical Research (EPI Info and SPSS). Literature review, Use of Physical and Virtual Library, Use of Internet, Search Engines, Systematic Reviews and Meta-analysis. Ethical considerations in medical research. Clinical Governance. Writing –Up, presentation and defence of Theses. Evidence Based Health Care. Statistical Methods (Summary, Inferences and Interpretation). Principles of Writing Articles for Publications. Research integrity and Plagiarism. Budget and Sources of Funding for Research.

PMC 996. Health Resource Management (College Course).

2 Credit Units

The objective is to facilitate acquisition of knowledge and necessary skills required for management of health resources in Health institutions and for programme implementation. Principles and application of Management. Strategic Management. Health Care Planning. Health Policy formulation and evaluation. Health Resources mobilization and allocation. Human Resources Management. Organization. Monitoring and Evaluation of Health Services. Performance Management. Sustainable Development. Problem Solving and Decision-Making skills. Emotional Intelligence. Leadership. Management of Change. Risk Management. Financial Management, Material Resources Management. Quality assurance in health and equity in health. Managing the Health Team-Leadership and Team building. Health Care Financing. Financial Resources Management and Cost-Recovery Systems. Health Economics- the Economic appraisal of Health Programme. Public Private Partnership (PPP). Health Services Management Information Systems. Essentials of Budgeting and Accounting. Social Marketing of Health Programmes. Ethical and Legal Considerations in Medical practice.

ANE 999. Dissertation

12 Credit Units

An approved Dissertation based on original work of candidate on an appropriate topic in paediatric anaesthesia subspecialty which will be supervised and

will be presented for assessment at the end of the programme.

270h (C)

I) Rotation Timetable

The 18 months mandatory for the paediatric anaesthesia specialisation will be divided as follows:

Rotation	Duration
Core Paediatric Anaesthesia	12 months
Paediatric Medicine	2 months
Paediatric Emergency	2 week
Paediatric Intensive Care	2 months
Neonatal Intensive Care	2 week
Flexible posting	1 month

The Core paediatric anaesthesia will include General surgical procedures, anaesthesia for ENT and head and neck, plastics and reconstructive surgery, oral and maxillofacial and restorative surgery, ophthalmic procedures, neurosurgical and cardiothoracic surgery, orthopaedic and trauma, Non-operating room anaesthesia and sedation service.

The centre program director will design the rotation of candidates depending on their numbers.

J) INTENDED LEARNING OUTCOMES OF THE PROGRAMME

By the end of the training, the candidate must have developed the following attributes.

1) Knowledge and Skills

- a) Display high level of knowledge in basic sciences as it relates to children.
- b) Display a good understanding of specific pathologies and conditions in children to determine the appropriate anaesthetic management plan.
- c) Interpret and clinically apply results of blood and radiological investigations eg – CXR, ECG, Echocardiogram, Blood gases,

2) Intellectual Skills

- a) Evaluate current treatment strategies and relate to existing health care standards.
- b) Understand controversies related to paediatric peri-operative management and appropriately apply to existing circumstances.
- c) Evaluate the need for input from other specialties.
- d) Deduce anaesthetic risk from existing pathologies and plan appropriate management protocols.

3) Practical Skills

- a) Proficiency in the peri-operative management of children of all ages
- b) Appropriately manage the difficult airway employing various simple and advanced airway devices
- c) Effectively institute and manage appropriate regional techniques in children.
- d) Proficiency in vascular access; venous (peripheral & central), arterial and intraosseous
- e) Apply appropriate ventilatory strategies in the critical care unit.

4) Transferable skills and Personal Qualities

- a) Maintain high ethical standards and compassion towards patients.
- b) Able to communicate well with patients of various ages using appropriate methods including assent.
- c) Maintain effective and compassionate communication with parents of patients including informed consent and counselling for poor prognosis & breaking bad news,
- d) Be up-to-date on new developments in Paediatric anaesthesia through continuous professional development.
- e) Able to efficiently organize the surgical operating list and organize the Paediatric Post Anaesthesia Care Unit (PACU).
- f) Able to work as a team member with colleagues and members of other disciplines and agree on perioperative management strategies
- g) Develop the ability to effectively mentor younger colleagues.
- h) Develop the traits of an effective teacher and trainer.
- i) Able to maintain good clinical judgement under stress.
- j) Able to recognize one's limitations and seek assistance from colleagues when necessary.
- k) Capable of carrying out relevant research and understanding the concepts of responsible research in children.

K. ASSESSMENT/ EVALUATION METHOD

(a) Training Evaluation

Trainees will be required to fill a logbook of at least 250 paediatric cases managed and procedures carried out.

The logbook will also document procedures observed or undertaken, tutorial sessions, academic presentations, journal club etc.

(b) Formative Assessment

The trainee will be required to undergo 4 competency assessments (every 3 months) on any case chosen (Appendix III). Feedback will be provided by the trainer.

(c) Summative Assessment.

Standard setting with the **Modified Angoff method** will be used for summative assessment of the candidates.

Summative Evaluation.

i) MD Programme: Candidates will defend the MD thesis in Paediatric Anaesthesia during the MD defence examination.

To proceed to the Fellowship, candidates will take the following during the Part 2 Fellowship examinations (Theory Paper-MCQ/SBA, OSCE and Structured Oral examination

- Theory Paper: 2 hours. MCQ (SBA). 100. Paediatric Anaesthesia- Applied Basic Sciences (25), Paediatric Surgical Diseases in older children (15). Neonatal Emergencies and surgical congenital abnormalities (10). Paediatric Medical Diseases (15), Principles and Practice of Paediatric Anaesthesia (35)
- **OBJECTIVE STRUCTURED CLINICAL EXAMINATION (OSCE): SIX STATIONS:** Duration of 1 hour comprising: (a) HISTORY TAKING/COMMUNICATION- 10 marks. (b) PHYSICAL EXAMINATION- 15 marks. (c) SKILLS-. 20 marks. (d) SKILLS.- 20 marks (e)

INVESTIGATIONS (XRAYs, CT, HAEMATOLOGY, ECHO. ECG, ABG. CLINICAL CHEMISTRY)- 15 marks. (f) PATIENT MANAGEMENT- 20 marks

- Structured Oral examination. General (50%) and subspecialty (50%)

ii) Fellowship Programme: Part 2 Fellowship Examination

The Part 2 Fellowship examination consists of the following: Theory Paper-MCQ/SBA, OSCE and Structured Oral examination

- Theory Paper: 2 hours. MCQ (SBA). 100. Paediatric Anaesthesia- Applied Basic Sciences (25), Paediatric Surgical Diseases in older children (15). Neonatal Emergencies and surgical congenital abnormalities (10). Paediatric Medical Diseases (15), Principles and Practice of Paediatric Anaesthesia (35)
- **OBJECTIVE STRUCTURED CLINICAL EXAMINATION (OSCE): SIX STATIONS:** Duration of 1 hour comprising: (a) HISTORY TAKING/COMMUNICATION- 10 marks. (b) PHYSICAL EXAMINATION- 15 marks. (c) SKILLS-. 20 marks. (d) SKILLS. - 20 marks (e) INVESTIGATIONS (XRAYs, CT, HAEMATOLOGY, ECHO. ECG, ABG. CLINICAL CHEMISTRY)- 15 marks. (f) PATIENT MANAGEMENT- 20 marks (TOTAL 100 marks)
- Structured Oral examination. General (50%) and subspecialty (50%). Duration is 1 hour
- Dissertation presentation and defence in Paediatric Anaesthesia

GRADING OF MARKS

GRADE	PERCENTAGE %
A (excellent)	≥ 70%
B (very good)	60-69%.
C (good)	55-59%
D (pass)	50-54%
E (borderline)	45-49%
F (fail)	< 45%

L CONDITION FOR A PASS

- i) Candidate must pass all sections of the examination to be awarded a pass
- ii) Candidate who fails any section(s) of the examination will be required to repeat the failed section(s) in a subsequent examination.

M. ACCREDITATION REQUIREMENTS.

i) General Requirements for Residency Training: The anaesthesia training programme is aimed at producing specialists in anaesthesia of a high degree of competence, comparable in the extent and depth of the training of anaesthesia Fellows in other parts of the world. The anaesthesia specialist should have a firm grasp of the scientific basis of anaesthesia, be skilled in the performance of anaesthetic duties and be conversant with research methodology and the

interpretation of research data. The provision of facilities for this level of training must be based on the objectives of the training and should cover the main areas of modern anaesthetic practice.

The institution must have accreditation for general fellowship training in addition to accreditation for training in anaesthesia.

Number of Trainers, related surgical specialties, minimum case load and variety cases, and, training facilities specific for the neuro-anaesthesia

- (a) Clinical Anaesthesia: Pre-Operative Care. Intra-Operative Care. Post-Operative Care
- (b) Resuscitation
- (c) Intensive Care
- (d) Pain Medicine

As much as possible, adequate facilities should be available in all these areas to give the candidate enough practice both in quantity, quality and variety.

Related disciplines and ancillary facilities for investigation must also be available. These include the core departments of Internal Medicine, Paediatrics, Surgery, Obstetrics & Gynaecology, Pathology, Radiology, and Medical Records. Details of their equipment in all areas are given below:

- i. An Institution for Postgraduate Training in anaesthesia must have a Department of Anaesthesia run by specialists in general and other subspecialties of anaesthesia, pain medicine and intensive care medicine, who are themselves Fellows of the National Postgraduate Medical College of Nigeria or are Fellows of other recognized Colleges or have equivalent qualifications. A minimum of two Fellows supported by residents in training would be required as a basic teaching unit.
- ii. As many branches of surgery as possible should be available in the hospital. These include General Surgery, Obstetrics & Gynaecology, Urology, Ophthalmology, E.N.T. Surgery, Orthopaedic and Trauma Surgery, Dental Surgery, Paediatrics and Plastic Surgery. While it is desirable to have a neurosurgical unit and a cardio-thoracic unit, it is not mandatory for basic specialist training. Residents in institutions without neurosurgical and cardio-thoracic units must do senior and junior residency rotations in fully accredited institutions as specified by the Faculty.
- iii. There must be an out-patient complex with Emergency Rooms and facilities for resuscitation, as well as out-patient theatre(s) for minor surgery and casualty.
- iv. Laboratories – The hospital must also have facilities for investigation in (a) Chemical Pathology. (b) Microbiology for routine and special investigations, and emergency. (c) Haematology and Blood Bank
- v. There should be an Intensive Care Unit for the management of critically ill or traumatised patients
- vi. There should be a Department of laboratory for research
- vii. There must be a suitable number of operating theatres to give the various specialties of surgery adequate operating time. Each theatre should have an anaesthetic room attached to it and should be fully equipped with anaesthetic, monitoring and resuscitation equipment. It is vital that there should be a recovery room equipped with monitors, resuscitation equipment to take a minimum, of two to four beds depending on the number of theatres.
- viii. The Radiology Department must be capable to doing routine – X-rays and other sophisticated

investigations (CT, MRI, contrast studies, Ultrasound, Doppler) which may be required by existing specialties and such facilities should extend to theatre and ICU.

- ix. There must be a good library with current anaesthesia journals and books in anaesthesia and related subjects. Internet connectivity and subscription to data bases should be available.
- x. Other departments viz: Medicine, Paediatrics, Surgery, Obstetrics & Gynaecology and Psychiatry must be suitably well developed to give the residents in training some experience in these disciplines.
- xi. There must be a suitable number of Anaesthetic and Monitoring equipment in all areas of Anaesthetic service. In addition to service equipment, there should also be equipment and simulation devices for teaching and research including teaching aids, models, audio-tapes, computers, CD Rom, etc.

ii) Additional Specific Accreditation Requirements for Paediatric Anaesthesia.

Basic Requirement

The institution must have current Full accreditation for post-graduate training in anaesthesia

Qualified personnel

The institution must have 2 paediatric anaesthetists (consultants) by training, one of whom must be a Fellow of the College.

Opportunities for learning / skill acquisition

The institution must be able to provide ample opportunity for training and acquisition of skills in paediatric anaesthesia. This should be shown in records of a minimum of 400 paediatric surgical cases done yearly.

The following specialties that commonly deal with children must be available – paediatric surgery, otorhinolaryngology, ophthalmology, orthopaedics, oral and maxillofacial and Burns & Reconstructive surgery. These should be reflected in a procedure register, candidates log book and theatre list.

There must be a Paediatric emergency centre with facilities for resuscitation supervised by a qualified consultant paediatrician.

There must be a neonatal intensive care unit/ Special care baby unit supervised by a consultant neonatologist.

There must be teaching aids to facilitate learning e.g. neonatal & paediatric manikins for CPR, manikins for intraosseous cannula, neonatal and paediatric airway manikins etc.

Equipment

The operating rooms must have equipment specially designed for children with the appropriate-sized attachments (See Appendix)

Structured Programme

The programme must be structured to include skills acquisitions, lectures, tutorials and journal club which should be supervised by a paediatric anaesthetist.

Regular feedback should be provided to the candidate and vice versa.

There should be ample accessibility to new information by provision of appropriate paediatric anaesthesia journals as well as access to the internet and on-line information.

Trainers/ Trainees ratio

A ratio of not more than 1:2 is ideal. The training paediatric anaesthetist consultant must have the Fellowship of the NPMCN or any other sister post graduate College