

(A) INTRODUCTION

Definition

Dual specialist certification of Paediatrics and Neonatology in Singapore

The programme provides opportunities for Advanced Specialist Training (AST) to trainees leading to dual specialist certification in both Paediatrics and Neonatology in Singapore.

There will be two exit examinations at the end of the AST programme conducted by the Specialist Training Committee (Paediatrics) and the College of Paediatrics and Child Health, Academy of Medicine, Singapore: one for specialist certification as a Paediatrician in Singapore, and another exit examination specifically for certification as a Neonatologist by the Specialist Accreditation Board (SAB) of the Singapore Medical Council (SMC). The two exit examinations can be conducted separately and at different time of the training period. On successful completion of the AST programme and upon appropriate registration with the SAB of SMC, he (she) is recognized both as a specialist in Paediatrics as well as a Neonatologist and be able to practice all levels of neonatal care from level I (normal), through level II (special care), to level III (intensive care).

Objective(s) of Training

The competences the trainees gained during BST form the basis for progression into Advanced Specialist Training (AST) and on to a Consultant post subsequently. The AST programme on Neonatology should be considered as part of the progression in the professional development in the AST phase of a Paediatrician and Neonatologist.

The expected competencies to be achieved are as follows:

1. Acquires understanding, knowledge and skills to provide appropriate clinical care.
2. Acquires clinical examination and assessment skills and applies these in clinical practice; then further develops analytic capabilities to derive appropriate differential diagnosis and management plans.
3. Proficient at all basic technical procedures, some complex procedures and provides advanced life support.
4. Plans and prioritizes tasks appropriately.
5. Contributes to the education of students, trainees, other health care professionals and to the community. Develops peer-mentoring skills.
6. Develops management skills and able to take responsibility for a defined project. Contributes to committees.
7. Designs audit project and understands risk management,
8. Able to write appropriate clinical guidelines and understands the Clinical Governance implications
9. Able to appraise the literature critically and apply to clinical practice.
10. Able to communicate effectively and compassionately with the familie
11. Able to take the lead and accept leadership from other members of the multi – disciplinary team.
12. Able to undertake accurate self-appraisal, develop a personal continuing education strategy and pursue life – long mastery of science and art of neonatal medicine.

(B) PROGRAMME OVERVIEW

Traineeship Duration for Advanced Specialty Training

The programme is based on the trainees' ability in acquiring advanced knowledge and skills in total neonatal care. It is therefore competence-based rather than time-based. In general, the duration of training is for a

minimum period of 24 months. This can be extended if the trainees have not been able to satisfy the minimum requirements as stipulated in the training objectives and content.

There will be a further 24 months of AST programmes in General Paediatrics so that the trainees can fulfil the competency requirements for certification as a specialist in general paediatrics. Trainees are to refer to a separate AST programme in general paediatrics.

(C) ADMISSION REQUIREMENTS

Entry Criteria/ Pre-requisites

Applicants must fulfill the following entry criteria/ pre-requisites as stated below:

- passed M.Med (Paediatrics) (NUS) **and/or** MRCPCH (UK) examination or their equivalent, and
- are deemed to have acquired the defined competences expected of them on completion of their Basic Specialist Training (BST)

There is 1 track to specialty training in Neonatology:

1. Paediatric Medicine AST

(D) TRAINING SYLLABUS

Detailed Syllabus

1. Perinatal Medicine - "The Foetal Patient"

The Neonatologist must have good basic understanding and knowledge of perinatal and foetal medicine in order to be an effective member of the perinatal team, contributing to the optimal care of the mother and the foetus, so as to achieve the best outcome for each pregnancy.

- Basic embryology and the embryological basis of malformation syndromes
- Foetal physiology and foeto-maternal interactions
- Foetal response to intrauterine hypoxic-ischaemic insults
- Basic genetics and practical genetic counseling
- Prenatal screening and diagnosis
- Understanding of ultrasound and biochemical screening for foetal abnormalities and other invasive and non-invasive diagnostic methods
- Foetal therapy
- Medical disorders in pregnancy and their implications on foetal growth and development
- Assessment of foetal growth, intrauterine growth restriction, small for gestational age, and large for gestational age
- Understanding of methods of assessment and monitoring of foetal well-being
- Understanding of preterm onset of labour, preterm pre-labour rupture of foetal membranes, and prolonged pregnancy
- Understanding of intra-partum foetal assessment
- Effects of prescribed and self-administered drugs during pregnancy
- Management of high-risk pregnancies as a member of the multi-disciplinary perinatal team
- Knowledge on assisted reproductive technology
- Knowledge on multiple gestation
- Understanding and knowledge of ethical issues in Maternal-Foetal Medicine
- Birth defects and Birth Defects Registry
- Adult consequences of foetal disease

2. Neonatal Medicine – “The Newborn Infant and the Family”

(A) Care around the time of birth

- Resuscitation of the newborn infant
- Stabilisation and transport of the high-risk newborn

(B) General Neonatal Care

- Classification and physical examination of the newborn
- Evaluation of the dysmorphic infant
- Temperature control and its disorders
- The physical environment and the newborn
- Infant feeding and nutrition
 - Nutritional physiology, dietary requirements of term and preterm infants
 - Feeding the full-term infants
 - Feeding the preterm and low birth weight infants
 - Breastfeeding and the use of human milk
 - Infant formulae and other special formulae
 - Drugs in pregnancy and lactation
- Parenteral nutrition
- Intensive care monitoring
- Acid-base, fluid, and electrolyte management
- Care of the normal term newborn baby
- Care of the normal small baby and the convalescing NICU graduate
- Skin care
- The infant of diabetic mother
- Twins and multiple births
- Analgesia and sedation in the newborn
- Post-surgical care and monitoring
- Developmental supportive care

(C) Disorders of the Newborn

- Pulmonary diseases of the newborn
 - Neonatal pulmonary physiology
 - Lung development and maturation
 - Respiratory distress syndrome and its management
 - Other acute respiratory disorders in term and preterm infants
 - Chronic lung disease in the newborn
 - Control of breathing and neonatal apnoea
 - Malformations of the respiratory tract
 - Congenital diaphragmatic hernia
 - Airway problems
 - Assisted ventilation and other special techniques in managing respiratory problems of the newborn
 - Blood gas monitoring
- Cardiovascular disease
 - Cardiovascular adaptation to postnatal life
 - Persistent pulmonary hypertension
 - Patent ductus arteriosus
 - Approach to congenital heart diseases
 - Evaluation and management of cardiac disease in newborn
 - Arrhythmias
 - Neonatal hypotension and shock
- Gastroenterology
 - Management of feeding problems
 - Neonatal jaundice and management of neonatal hyperbilirubinaemia
 - Cholestasis in newborn and infancy
 - Liver disease
 - Gastrointestinal disorders

- Necrotising enterocolitis
- Congenital defects and surgical problems
- Haematology
 - Haemolytic disease of the newborn
 - Bleeding and coagulation disorders
 - Anaemia in the newborn
 - Polycythaemia – hyperviscosity syndrome
 - Thrombocytopenia
 - Neonatal thrombosis
 - Hydrops fetalis: immune and non – immune
 - Use of blood products Birth defects and syndromic
- Disorders Neonatal ophthalmology: retinopathy of prematurity Neonatal oto-laryngology and neonatal hearing
- Screening Neonatal dermatology Iatrogenic disorders
- Metabolic and endocrine disease
 - Carbohydrate homeostasis in newborn: hypoglycaemia and hyperglycaemia
 - Endocrine disorders
 - Inborn errors of metabolism
 - Calcium and magnesium homeostasis
 - Metabolic bone disease
 - Congenital hypothyroidism
 - Ambiguous genitalia and interderminate sex
 - Miscellaneous endocrine problems
- Disorders of the kidneys and urinary tract
 - Renal function, fluid and electrolyte balance and neonatal renal disease
 - Acute renal failure
 - Urology in the neonatal period
- Orthopaedic problems in the newborn
- Neonatal infection
 - Neonatal immunology
 - Congenital infection
 - Perinatal infection
 - Nosocomial infection
 - Neonatal immunization
- Neurological problems in the newborn
 - Assessment of the neonatal nervous system
 - Ultrasound of the infant brain and other neuro – imaging
 - Seizures in the newborn
 - Intracranial haemorrhage
 - Hypoxic – ischaemic encephalopathy
 - Preterm brain injury
 - Hereditary and degenerative CNS disease
 - Muscle disease in the newborn
 - Central nervous system malformations
- Birth trauma
- Surgical emergencies in the newborn
- Effects of maternal drugs on the foetus
 - Perinatal substance abuse and withdrawal
- Neonatal imaging
- Neonatal pharmacology and therapeutics
- Malignancy in the newborn

3. Follow – up Care and Management of the High – Risk Infant – “Beyond the Nursery”

It now becomes imperative that centres that provide neonatal intensive care also provide a mechanism to

ensure continuing care and evaluation of their high – risk graduates. Neonatal follow – up should be an integral part of neonatal – perinatal medicine and serves as a quality control mechanism of the perinatal care.

The training under the follow – up programme would include:

- Discharge planning
- Fostering family development after newborn hospitalization
- Well – baby care of the ICN graduate
- Behavioural and neurodevelopmental assessment
- Management and after – care of chronic medical problems and sequelae associated with neonatal care
- Knowledge of social and community support for the family
- The mechanics of follow – up clinics
- Communication and counseling of the parents and family

4. Organization and Delivery of Neonatal Care

- Perinatal and neonatal epidemiology: Changing trends in mortality and morbidity patterns
- Organisation of perinatal care
- Perinatal out – reach professional and public education
- Standards and clinical audit: evaluating and improving the quality of neonatal care
- The economics of neonatal – perinatal care
- Handling perinatal death and bereavement follow – up
- Clinical risk management
- Psychological aspects of neonatal care
- Ethical issues and decision – making in the perinatal period
- Medico – legal problems in perinatal care
- Care of the parents
- Neonatal screening

5. Procedures and Investigations

(A) Preparation and support

- Informed consent for procedures
- Maintenance of homeostasis
- Methods of restraint
- Aseptic preparation
- Procedural sedation and analgesia

(B) Physiological monitoring

- Temperature monitoring
- Cardiorespiratory monitoring
- Blood pressure monitoring
- Continuous blood gas and oxygen saturation monitoring
- Pulmonary function monitoring

(C) Blood sampling

- Vessel transillumination
- Venipuncture
- Arterial puncture
- Capillary blood sampling
- Management of vascular spasm, thrombosis, and infiltrate

(D) Miscellaneous sampling

- Lumbar puncture

- Suprapubic bladder aspiration
 - Bladder catheterization
 - Bone marrow aspiration
- (E) Vascular access
- Peripheral intravenous line placement
 - Umbilical artery catheterization
 - Umbilical vein catheterization
 - Peripheral arterial cannulation
 - Central venous catheterization via peripheral veins
- (F) Respiratory care
- Bag and mask ventilation
 - Endotracheal intubation: orotracheal and nasotracheal
 - Continuous positive airway pressure (CPAP)
 - Airway management and care
 - Diagnosis and drainage of pneumothorax
- (G) Tube placement
- Thoracentesis, chest tube insertion and placement
 - Gastric tube
 - Abdominal paracentesis
- (H) Transfusions
- Transfusion of blood and blood products
 - Infusion of parenteral nutrition
 - Exchange transfusion
- (I) Neonatal Imaging
- Ultrasound of the infant brain
 - 2 – D Echocardiography (not mandatory)
 - X – Ray interpretation
- (J) Others
- Tapping of ventricular reservoirs
 - Conjunctival scraping

Training Methods

The AST trainees will be attached full-time to an accredited Department of Neonatology and be under the supervision and mentorship of the Consultant(s) of the Department. There must be regular meetings between the trainees and the supervisors to discuss the progress of the training. It is important that the trainees maintain a log-book on the training experience and the supervisors should review the accuracy of the content of the log-book and to provide guidance to the trainees on areas of deficiency.

- Clinical skill development through joint management of patients in the setting of a tertiary neonatal – perinatal centre
- Acquisition of knowledge through daily ward rounds in nurseries, high-risk maternity wards and labour ward.
- Subject reviews through journal clubs, seminars, conferences and combined neonatal meetings
- Clinical research experience through participation in research projects as investigator
- Teaching experience: active participation in the teaching programme of the department, training and educating junior doctors, nurses, and medical students, perinatal outreach professional and public education.
- Participation in regional and international perinatal meetings
- Participation in neonatal follow-up clinics and developmental and medical assessment and care of high-

- risk infants
- Communication with and counselling of families
- Administrative committee works

(E) INSTITUTIONAL REQUIREMENTS

TRAINING DELIVERABLES

All training units must provide all trainees, except for SAF sponsored trainees, (irrespective of the specialties pursued) with the training deliverables, as follows:

- a) at least one session (half day) of protected time per week to be dedicated to pure training/learning activities.
- b) 12 days of study leave per year for their training activities (e.g. in-training exams and reviews).

(F) SUPERVISION OF TRAINEES

All AST trainees will be supervised by a designated consultant/ supervisor but in general all the consultant staff will be duty bound to take an active part in teaching. Assessment of progress and log should take place at least 6 monthly.

(G) ASSESSMENT AND FEEDBACK

Logbook

All trainees are expected to keep a log book which will be reviewed on a monthly basis by the main supervisor. The log book will have a record of cases managed or consulted. Notes should be made regarding difficult or complicated cases. CME activities should also be recorded.

All other teaching experiences e.g. conferences, seminars, papers presented should also be recorded.

Feedback

Six-monthly interviews/paper-based survey with the trainees should be conducted to ensure that the training objectives for each rotation have been adequately met, as well as to monitor for any difficulties in workload and training activities.

(H) EXIT EXAMINATION

The trainee will be critically appraised by his/ her track record on clinical competence, knowledge and experience in neonatal – perinatal management, commitment and enthusiasm in teaching, and performance in research activities.

Although it is not mandatory for the trainee to have at least one publication in a journal, it will be to the advantage of the trainees to have at least one scientific paper, either published or accepted for publication. However, the minimum requirement is for the trainee to have presented at least once, either in the form of oral presentation or poster, in a local scientific meeting.

Exit Examination Format

The trainee is required to have a write – up on a neonatal topic of his (her) choice, giving an account of his (her) personal experience and opinion on the management of that particular neonatal condition. The topic can be decided with the advice of his (her) supervisor / mentor. Trainees are required to submit the topic of their write – up for Neonatology SSTC's approval before embarking on the write – up. The write – up should be submitted for discussion at the exit examination to be conducted by the Specialist Training Committee (Paediatric Medicine) and the College of Paediatrics and Child Health, Academy of Medicine, Singapore.

The exit examination shall consist of the following sections:

- Appraisal of the neonatal topic write – up and assessment of experience and competence based on the log book. The length of the write – up should be that of a reviewed article.
- Discussion on a journal article on Neonatology including Neonatal Intensive Care.
- Discussion on the ethical issues and controversies in neonatal – perinatal care.
- Communication and counseling skills on a neonatal clinical scenario.

(I) CHANGES TRAINEESHIP PERIOD & WITHDRAWAL OF TRAINEESHIP

Changes in Training Period

Specialty training should be continuous. If a training programme is interrupted for any reason whatsoever, the STC/JCST may at its discretion, require the trainee to undergo a further period of training in addition to the minimum requirements of the programme or terminate the traineeship altogether.

All trainees are required to conform to the traineeship period and training plan as approved by STC and JCST. If you wish to change to part-time training or defer traineeship, approval is to be sought prospectively from JCST through STC.

Overseas Training

Approval for accreditation for training programmes conducted in overseas centres has to be sought prospectively from JCST through the STC.

Withdrawal of Traineeship

Upon appointment as trainee, should you decide to withdraw from traineeship, you are required to submit a withdrawal letter to JCST indicating your reasons for withdrawal.

(J) GENERAL GUIDELINES

Please refer to Annex 1 for General JCST Guidelines on the following :

- Leave Guidelines
- Training Deliverables
- Retrospective Recognition
- Changes to Training Period
- Part-time Training
- Overseas Training
- Withdrawal of Traineeship
- Exit Certification