

Specialty Training Requirements (STR)

Name of Specialty:	Neonatology
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Note : In addition to the training requirements stated in this STR, residents must comply with any other regulatory requirements or practice-based requirements mandated by the healthcare institutions or place of practice.

Scope of Neonatology

Neonatology is a subspecialty of Paediatrics and it encompasses the medical care of newborn infants. A neonatologist provides comprehensive care to critically ill infants in the neonatal intensive care unit as well as caring for well newborn infants in the postnatal wards. The spectrum of clinical conditions and the care required is vast, from the term baby with feeding issues on the postnatal ward to the sick, fragile, extremely preterm baby with multiple problems in the Neonatal Intensive Care Unit (NICU). Long-term follow-up with developmental screening until 2 to 8 years of age is provided by the specialists in Neonatology.

Purpose of the Residency Programme

Residents entering the programme would have achieved competence in paediatric and neonatal care to the level of a General Paediatric Specialist, including an understanding of Adolescent Medicine.

The purpose of the Neonatology residency programme is to train specialists who are competent in providing comprehensive care to a critically ill baby on the neonatal intensive care unit whilst ensuring the care of well term babies on the postnatal ward. The spectrum of clinical conditions and the care required is vast, from the term baby with feeding issues on the postnatal ward to the sick, fragile, extremely preterm baby with multiple problems.

The residency programme is for a duration of 2 years and at the end of the 2nd year trainees will appear for the Neonatology exit examination. On successful completion of the residency programme and upon appropriate registration with the Specialist Accreditation Board (SAB) of Singapore Medical Council, he / she is recognised as a Specialist Neonatologist and is able to practice all levels of neonatal care from level I (normal), through level II (special care), to level III (intensive care).

Admission Requirements

At the point of application for this residency programme,

- a) Applicants must be either completing or had completed their primary specialty in Paediatric Medicine;
- b) Applicants must be employed by employers endorsed by Ministry of Health (MOH); and
- c) Residents who wish to switch to this residency programme must have waited at least one year between resignation from his / her previous residency programme and application for this residency programme.

At the point of entry to this residency programme, residents must have fulfilled the following requirements:

- a) Have obtained specialist accreditation in Paediatric Medicine, or have applied for specialist accreditation in the Paediatric Medicine from SAB; and
- b) Have a valid Conditional or Full Registration with Singapore Medical Council (SMC).

Selection Procedures

Applicants must apply for the programme through the annual residency intake matching exercise conducted by MOH Holdings (MOHH).

Continuity plan: Selection should be conducted via a virtual platform in the event of a protracted outbreak whereby face-to-face on-site meeting is disallowed and cross institution movement is restricted.

Less Than Full Time Training

Less than full time training is not allowed. Exceptions may be granted by SAB on a case-by-case basis.

Non-traditional Training Route

The programme must not accept application for mid-stream entry to residency programme by an International Medical Graduates (IMG).

Separation

The Programme Directors (PD) must verify residency training for all residents within 30 days from the point of notification for residents' separation / exit, including residents who did not complete the programme.

Duration of Specialty Training

The training duration must be 24 months.

Maximum candidature:

All subspecialty residents must complete the training requirements, requisite examinations and obtain their exit certification from JCST not more than 24 months beyond the usual length of their training programme. The total candidature for Neonatology is 24 months Neonatology residency + 24 months candidature.

Nomenclature: Neonatology residents will be denoted by SS1 and SS2 according to their residency year of training

"Make-up" Training

"Make-up" training must be arranged when residents:

- Exceed days of allowable leave of absence / duration away from training;

or

- Fail to make satisfactory progress in training.

The duration of make-up training should be decided by the Joint Coordinating Committee (JCC)¹ and should depend on the duration away from training and / or the time deemed necessary for remediation in areas of deficiency. The JCC should review residents' progress at the end of the "make-up" training period and decide if further training is needed.

Any shortfall in core training requirements must be made up by the stipulated training year and / or before completion of residency training.

Learning Outcomes: Entrustable Professional Activities (EPAs)

Residents must achieve level 4 of the following EPAs by the end of residency training:

	Title
EPA 1	Managing critically ill neonates in intensive care
EPA 2	Managing and discharge-planning of neonates in special care nursery
EPA 3	Providing neonatal end-of-life care
EPA 4	Delivering outpatient services and overseeing care for high-risk infants
EPA 5	Providing neonatal consultation for high-risk pregnancies
EPA 6	Performing core neonatal procedures
EPA 7	Leading advanced neonatal resuscitation, stabilisation and transport

Information on each EPA is provided in [Annex C.R3](#).

Learning Outcomes: Core Competencies, Sub-competencies and Milestones

The programme must integrate the following competencies into the curriculum, and structure the curriculum to support resident attainment of these competencies in the local context.

Residents must demonstrate the following core competencies:

1) Patient Care and Procedural Skills

Residents must demonstrate the ability to:

- Gather essential and accurate information about the patient
- Counsel patients and family members
- Make informed diagnostic and therapeutic decisions
- Prescribe and perform essential medical procedures

- Provide effective, compassionate and appropriate health management, maintenance, and prevention guidance.

Residents must demonstrate competence in:

- Performing complete antenatal history, obtaining accurate and essential information from the mother and the obstetrician managing the mother.
- Resuscitation details and physical exams and assessment of the baby who needs NICU or Special Care Nursery.
- Establish a differential diagnosis, evaluation plan and management plan for common signs and symptoms of neonatal care of term and preterm infants.
- Communicate findings in a complete, written note and orally present them in a concise manner.
- Order appropriate laboratory investigations, procedures and imaging studies for babies with varied neonatal problems. Ability to interpret relevant laboratory studies, X-rays and cranial ultrasonography
- Initiate appropriate therapy including non-invasive ventilatory support, invasive mechanical ventilation
- Initiate appropriate parenteral or enteral nutrition
- Acquisition of advanced life support management skills such as High frequency Oscillatory Ventilation (HFOV), inhaled Nitric Oxide therapy and Indications for Extra Corporeal Membrane Oxygenation (ECMO).
- Perform common neonatal procedures such as Umbilical and radial arterial lines, umbilical venous lines, Central venous catheter (long-line) insertion, chest-drain for drainage of pneumothorax or pleural effusion and basic Cranial Ultrasound examination.

2) Medical Knowledge

Residents must demonstrate knowledge of established and evolving biomedical, clinical, epidemiological and social-behavioural sciences, as well as the application of this knowledge to patient care.

Residents are expected to acquire structured foundation and knowledge across physiology, pathology and clinical management of newborns, especially preterm and ill infants. This includes:

- Core Neonatal Physiology
- Transition from fetal to neonatal circulation
- Respiratory and cardiovascular adaptation at birth
- Thermoregulation and fluid balance
- Glucose and electrolyte homeostasis
- Renal and hepatic adaptation
- Respiratory Care
 - Common respiratory problems in preterm infants and newborns (eg, Respiratory Distress Syndrome, Transient Tachypnoea of Prematurity, Pneumonia, Chronic Lung Disease of prematurity)
 - Mechanical ventilation
 - Non-invasive ventilation
 - Blood gas interpretation
- Cardiovascular Disorders

- Congenital heart disease (cyanotic and acyanotic)
- Management of shock
- Management of Persistent Pulmonary Hypertension of the Newborn (PPHN).
- Management of patent ductus arteriosus
- Neonatal infections
 - Early and Late-onset infections
 - TORCH infections
 - Antibiotic stewardship
- Nutrition and Gastroenterology
 - Preterm nutrition (Parenteral and Enteral) and growth
 - Breastfeeding and human milk
 - Management of Necrotizing Enterocolitis
- Neurology
 - Management of Therapeutic Hypothermia for babies with Hypoxic Ischemic Encephalopathy
 - Recognition and management of Neonatal seizures
 - Intraventricular haemorrhage
- Haematology and Metabolic Issues
 - Neonatal jaundice
 - Neonatal anaemia and thrombocytopenia
 - Coagulation disorders
 - Inborn errors of metabolism
- Prematurity
 - Care of the extremely premature infants – including monitoring of growth and nutrition
 - Complications of prematurity
 - Developmental Care in NICU and Neonatal Special Care Nursery Unit (SCN)
 - Long term neurodevelopmental follow-up
- Multiple gestation and Major Malformations
 - Management of Twin-to-twin transfusion syndrome and growth restricted twins
 - Management of babies with Major Malformations and complex surgical cases – e.g. Congenital Diaphragmatic Hernia, Anterior Abdominal wall defects – including antenatal counselling
- Understand the pharmacology, indications, age-appropriate dosages and side effects of commonly prescribed medications
- Counsel parents regarding a sick baby's problems, duration of NICU stay & hospitalisation and the prognosis regarding the short-term as well as long-term outcome.

3) System-based Practice

Residents must demonstrate the ability to:

- Work effectively in various health care delivery settings and systems relevant to their clinical specialty
- Coordinate patient care within the health care system relevant to their clinical specialty
- Incorporate considerations of cost awareness and risk/benefit analysis in patient care
- Advocate for quality patient care and optimal patient care systems
- Work in inter-professional teams to enhance patient safety and improve patient care quality. This includes effective transitions of patient care and structured patient hand-off processes.
- Participate in identifying systems errors and in implementing potential systems solutions

4) Practice-based Learning and Improvement

Residents must demonstrate a commitment to lifelong learning.

Resident must demonstrate the ability to:

- Investigate and evaluate patient care practices
- Appraise and assimilate scientific evidence
- Improve the practice of medicine
- Identify and perform appropriate learning activities based on learning needs

5) Professionalism

Residents must demonstrate a commitment to professionalism and adherence to ethical principles including the SMC's Ethical Code and Ethical Guidelines (ECEG).

Residents must:

- Demonstrate professional conduct and accountability
- Demonstrate humanism and cultural proficiency
- Maintain emotional, physical and mental health, and pursue continual personal and professional growth
- Demonstrate an understanding of medical ethics and law

6) Interpersonal and Communication skills

Residents must demonstrate ability to:

- Effectively exchange information with patients, their families and professional associates.
- Create and sustain a therapeutic relationship with patients and families
- Work effectively as a member or leader of a health care team
- Maintain accurate medical records

Other Competency: Teaching and Supervisory Skills

Residents must demonstrate ability to:

- Teach junior registrars, medical officers, Paediatrics residents, and nurses.

Learning Outcomes: Others

Residents must attend Medical Ethics and, Professionalism and Health Law course conducted by Singapore Medical Association (SMA).

Curriculum

The curriculum and detailed syllabus relevant for local practice must be made available in the Residency Programme Handbook and given to the residents at the start of residency.

The PD must provide clear goals and objectives for each component of clinical experience.

Learning Methods and Approaches: Scheduled Didactic and Classroom Sessions

In the event of an outbreak where face-to-face teaching is disallowed, these learning activities should be conducted via virtual platforms.

The programme must schedule and residents must attend the following:

Type of scheduled learning activities	Frequency	Remarks
CME lecture on Neonatology topics	1 hour per week	
Neonates specific CME	1 hour per week	This should be in the form of clinical case discussion, topic reviews, or Ultrasound or MRI based discussion.
Journal Club	1 hour per week	
Morbidity and mortality round	1 hour per month	
Procedural training	8 hours per month	
Perinatal Mortality Meetings	4 x per year	These sessions should be held regularly throughout the year
Peer review round	4 x per year	These sessions should be held regularly throughout the year
Multi-disciplinary meetings	4 x per year	These sessions should be held regularly throughout the year and examples are combined high risk consult or birth defect meetings with obstetrics team, radiology rounds, or MDT discussions on complex patients.

Learning Methods and Approaches: Clinical Experiences

In totality 24 months of Neonatal postings are to be completed in the residency programme.

Mandatory Clinical rotations to be completed by the residents are as follows:

Neonatal Intensive Care Unit (NICU)	Minimum 8 months
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Neonatal Special Care Nursery Unit (SCN)	Minimum 6 months
Well-baby Nursery	Minimum 3 months
Follow-up Neonatal Clinics	Minimum 3 months

The shortfall of 4 months can be met through added rotations through either NICU, SCN, or Neonatal clinics, or rotations through Neonatal standbys and resuscitation and central line / procedure team.

Residents can also choose a one-month elective in an area out of Neonatal Department, such as Children's Intensive Care Unit, Palliative Care Service, or Paediatric Gastroenterology and Hepatic Service. For electives, the area of interest must be indicated by the resident at the start of the training, and the elective posting will be in the second year of training.

Learning Methods and Approaches: Scholarly / Teaching Activities

Residents must complete the following scholarly / teaching activities:

	Name of activity		Brief description: nature of activity, minimum number to be achieved, when it is attempted
1.	Case presentation with literature review		Once every 6-month rotation, such as during grand rounds, peer review learning, morbidity and mortality rounds, subspecialty meetings.
2.	Teaching and supervision of medical students, interns and junior residents		At least once during residency.
3.	Research or clinical practice improvement / quality improvement project or publication		At least one of any of the following • Presentation of the results of a research project at a local, regional or international conference or Completion of a project related to Neonatology • Writing of guidelines

			• Clinical practice improvement / quality improvement projects • Successful submission of an external grant • First author paper published in a peer-reviewed journal, preference will be for a hypothesis-driven piece of work, or a critical meta-analysis of the literature, or a systematic review of clinical practice • Part of a thesis submission for a PhD or Masters of Clinical Investigation
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Learning Methods and Approaches: Documentation of Learning

Residents must keep a log of their clinical and procedural experience in the designated Neonatology Training Logbook / Portfolio. They must see and log a variety of clinical cases and practical procedures (shown below) during every 6-month training period and get them signed by their supervisors.

Residents must see and log a variety of clinical cases during every 6-month training period.

Residents must perform and log the following procedures:

Procedures	Minimum Number to be completed by end of training
Percutaneous Long Line Insertion	5
Surfactant Administration	5
Chest drain / pigtail insertion (Simulation allowed)	2
Umbilical venous catheter insertion	5
Umbilical arterial catheter insertion	2
Peripheral arterial line insertion	5
Double volume exchange transfusion (Simulation allowed)	1
Partial Exchange Transfusion (Simulation allowed)	1
Point-of-Care Ultrasound (POCUS) Cranial	10

Amplitude-integrated electroencephalography (aEEG) (Simulation allowed)	2
Endotracheal tube intubation	10

Summative Assessments

	Summative assessments	
	Clinical, patient-facing, psychomotor skills etc.	Cognitive, written etc.
SS1	Nil	Nil
SS2	Attainment of requisite entrustment levels for EPAs	Viva Voce Exit Examination (total 3 stations, 20 minutes per station): a. Neonatal Clinical Case b. Ethical Clinical Case c. Journal Critique

S/N	Learning Outcomes	Summative assessments	
		Viva Voce Exit Examination	Attainment of requisite entrustment levels for EPAs
EPA 1	Managing critically ill neonates in intensive care	√	√
EPA 2	Managing and discharge-planning of neonates in special care nursery	√	√
EPA 3	Providing neonatal end-of-life care	√	√
EPA 4	Delivering outpatient services and overseeing care for high-risk infants	√	√
EPA 5	Providing neonatal consultation for high-risk pregnancies	√	√
EPA 6	Performing core neonatal procedures		√
EPA 7	Leading advanced neonatal resuscitation, stabilisation and transport	√	√