Neonatology Subspecialty Training Curriculum
MALTESE PAEDIATRIC ASSOCIATION

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## Abbreviations

<table>
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<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>CCBST</td>
<td>Certificate of Completion of Basic Specialist Training</td>
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<td>CCST</td>
<td>Certificate of Completion of Specialist Training</td>
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<tr>
<td>ESN</td>
<td>European Society of Neonatology</td>
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<td>EU</td>
<td>European Union</td>
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<tr>
<td>HST</td>
<td>Higher Specialist Training (Trainee)</td>
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<tr>
<td>MPA</td>
<td>Maltese Paediatric Association</td>
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<tr>
<td>SAC</td>
<td>Specialist Accreditation Committee</td>
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<td>UEMS</td>
<td>European Union of Medical Specialists</td>
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Introduction

Neonatology is a highly technical and rapidly evolving branch of paediatric medicine which is established as an independent specialty in most European countries. Neonatology is one of the paediatric specialist training programmes as defined by the European Union of Medical Specialists and the Specialist Accreditation Committee of Malta.

The Neonatology training curriculum has been developed by the Maltese Paediatric Association as a framework for the national training programme in neonatology and neonatal medicine. It has been closely based on the latest ‘European curriculum and syllabus for training in neonatology’ published by the European Society for Neonatology.

The aim of this training programme is to promote high standards in training with an aim to achieve excellence in patient care.

Through this document, the MPA aims to create a neonatology training programme which both satisfies and exceeds training criteria as laid out by the Paediatric Section of the UEMS thereby guaranteeing equivalence to other European Union training programmes carried out under the auspices of the ESN.

This document defines the aims and rationale of training, entry criteria, skill requirements and the duration of the training programme.

This Neonatology Training Curriculum is accompanied by the Neonatology Training Portfolio. The curriculum will be considered to have been completed upon successful completion of the Training Portfolio within the timeframe defined by this curriculum (Figure 1).

Upon certifying successful completion of the Neonatology Training Curriculum the MPA will recommend the trainee for inclusion in the Neonatology register of Specialists maintained by the SAC.
1. Aims of training

1.1 Training syllabus

The training provided should equip the doctor with the necessary knowledge, skills and attitudes required to practice high quality neonatal medicine.

The trainee Neonatologist should acquire detailed knowledge of:

1.1.1 Epidemiology: Mortality and morbidity rates in the perinatal period and factors which influence mortality and morbidity. Methods of data collection at national and local level, including birth and death notification systems and audits aimed at quality assessment.

1.1.2 Pathophysiology of the foetus: Foetal growth and development and the means of its assessment. Impact of the major diseases of pregnancy on the foetus, e.g. hypertensive disease, maternal medical conditions, ante-partum haemorrhage, and preterm labour. Detection of foetal anomalies and collaborative prenatal counselling.

1.1.3 Physiology of postnatal adaptation: Respiratory, cardiovascular and other physiological changes at birth. Development of organ systems and physiological changes after birth. Physiology of breast feeding.

1.1.4 Pathophysiology of prematurity: Respiratory development and pathology including surfactant deficiency and its sequelae. Cardiovascular problems including patent ductus arteriosus and persisting pulmonary hypertension. Gastrointestinal development and feeding, renal maturation and fluid balance. Neurological problems, including pathogenesis of intraventricular haemorrhage and periventricular leukomalacia.

1.1.5 Pathophysiology of conditions encountered in premature and mature infants: Congenital abnormalities and their management. Perinatal hypoxia and consequences of hypoxia and ischemia. Metabolic adaptation to postnatal life. Inborn errors of metabolism including screening programmes for their detection. Neonatal immunity and pathogenesis of perinatal/neonatal infection.

1.1.6 Pharmacology in the perinatal/neonatal period: Pharmacokinetics in the term and preterm newborn, drug toxicity and interactions. Influence of maternal medication on neonatal condition, effects of maternal drug abuse on the foetus and newborn infant, and transmission of drugs via breast milk.

1.1.8 **Follow-up of high risk infants:** Outcomes associated with perinatal high risk groups (e.g. prematurity, foetal growth restriction and intrapartum hypoxia), diagnosis and counselling associated with cerebral palsy, visual and hearing defects, chronic respiratory problems and an understanding of the importance of other neurocognitive outcomes.

1.1.9 **Ethical issues and legal problems:** including National and European practice

**Trainees will be expected to have acquired skills in the following domains:**

1.1.10 **Practical procedures:** Resuscitation of the newborn, tracheal intubation and techniques of artificial ventilation. Insertion of arterial catheters (umbilical and peripheral), establishment of intravenous infusion and long intravenous lines. Blood transfusion and exchange transfusion. Arterial puncture, pleural drainage
of pneumothorax, suprapubic aspiration of urine, lumbar and ventricular puncture.

1.1.11 **Diagnosis:** Interpretation of neonatal chest radiological investigations. Role of specialised investigations, e.g. MRI, CT. Experience in interpreting results of ultrasound examination of the nervous system. Ordering and interpretation of common laboratory and micro-biological investigations. Use and interpretation of the results of EEG and assisted EEG.

1.1.12 **Clinical practice:** Clinical examination of sick and healthy newborn baby, recognition of specific neonatal problems including deformation and malformation, assessment of gestational age. Developmental and neurological assessment of the older infant and child and the assessment of disability.

1.1.13 **Communication:** Counselling and communication skills including appropriate approach to distressed and bereaved parents, disclosure of “bad news”, handling of autopsy reports. Staff support and team dynamics. Co-operation and consultation with other medical specialists.

1.1.14 **Technology:** The neonatologist will be expected to understand basic mechanical and electrical function of radiant heaters, incubators, ventilators, and monitoring equipment.

1.1.15 **Teaching:** The neonatologist should be trained and involved in teaching activities including teaching programmes for doctors and nurses.

1.2 **Personal development**

The neonatal specialist role includes leadership within the clinical team and many neonatologists undertake important management roles within the team and within their host organisation (usually their Hospital or University). In particular the training programme must equip the trainee with the personal skills necessary to fulfil these roles:

- Counsellor
- Manager
- Leader
- Teacher
- Clinical governance and audit
1.3 Purpose of training

The use of this curriculum through the assessment framework should result in the neonatologist being competent at providing clinical care within the framework of a specialised tertiary care unit, division, department or hospital. This clinical care should include routine application of various specialised diagnostic and therapeutic methods.
2. Criteria for entry into the neonatology training programme in Malta

Candidates submitting their interest to be considered for entry into the Neonatology training programme must be in possession of:

1. Full registration with the Medical Council of Malta.
2. Completion of Basic Specialist Training in Paediatrics (CCBST or equivalent).
3. Success in an open call for application for the post of Higher Specialist Trainee in Neonatology in a locally recognised institution.

3. General requirements, duration and structure of higher specialist training in neonatology

3.1.1 Unless otherwise specified any period of training referred to within this document is assumed to be full-time or part-time pro-rata. Any quoted duration of training is the minimum required (or pro-rata equivalent) for certification.

3.1.2 For the purposes of completion of training:
   i. Training must be undertaken within an on-call rota.
   ii. In case the trainee is working on a ‘reduced hour’ or ‘part-time schedule’, training will be counted on a pro-rata basis taking into consideration an adequate balance of supervised clinical training and out-of-hours duties.
   iii. The trainee should have out-of-office hours experience in accordance with departmental rota requirements, but not less than 45 duties per year (equivalent to 1:8).

3.1.3 Part time trainees will have their training recognized pro-rata; a total of 13 weeks of maternity leave throughout the entire duration of training (in addition to the normal entitlement of leave) can be recognized as part of the training period; however any longer period of leave will not be considered as training.

3.1.4 The following training criteria must be satisfied for CCST to be issued to the trainee:
   a. Training undertaken must be at least 50% of full-time training with total duration of training extended pro-rata.
   b. At least 50% of training must be undertaken in a training centre in Malta that is recognized by the SAC
c. The trainee shall record all stages of training and activities related to training in a log-book/e-portfolio.

3.1.5 All paediatric subspecialty trainees are expected to acquire dual certification. The trainee first acquires certification in General Paediatrics after a minimum of 4 years training in General Paediatrics at the level of HST and achievement of all required competencies. Subsequently, certification in Neonatology is acquired after a further 2 years of training with achievement of all required competencies. The total duration of training in Neonatology is 4 years full time (or part time equivalent) - 2 years between year 1 and 4 (which will run concurrently with training in General Paediatrics), and year 5 and 6 (Fig 1).

(The requirements for entry into the General Paediatric register are described in another document ENDORSED BY THE SAC. This document will focus on the requirements for Neonatology.)

3.1.6 The trainee is expected to spend a period of overseas training of not less than 1 year and up to a maximum of two years, full-time (or part-time equivalent) in a tertiary neonatal intensive care unit abroad that is recognized by the MPA and SAC. The European overseas neonatal centre must have the capacity to provide all levels of care ranging from intensive care to transitional care to sick preterm and term newborns and must be recognized by the MPA and SAC as an accredited training centre. This period of training can be done at any time between year 4 and year 6 of subspecialty training, provided that the trainee has already achieved a minimum of 12 months experience in the subspecialty in the local centre, and, that the last 6 months of training (in year 6), are also done in a locally recognized institution within the Maltese territory. Training abroad will be vetted by the Postgraduate Training Coordinator/s for suitability, and approved by the MPA and the SAC. This period of training will have stipulated training targets that are aimed at filling specific gaps in the training undertaken locally, and/or to further expose the trainee to the full breadth of the specialty. The trainee is to submit a detailed record of training undertaken abroad, duly signed by a mentor/s at the institution. The trainee still needs to document
his/her training on the local e-portfolio by inviting the mentors or supervisors in
the new training centre to complete the required accomplishment forms.

3.1.7 Trainees shall be involved in the care of ambulatory patients (including
children’s outpatient and paediatric day care unit) and of inpatients (including
paediatric wards, NPICU and management of emergencies).

3.1.8 Progression through subspecialty training neonatology (Year 1 through to Year
6) is dependent on satisfactory appraisal, which may include written or oral
examinations, done by clinical/educational supervisors (1-2 formal assessments
per year).

3.1.9 The trainee is expected to participate and contribute to teaching activities within
the department, participate actively in local and international meetings, and
contribute to the medical literature through scientific publications.

3.1.10 Trainees in neonatology are expected to have spent a period of not less than 6
months full time (or part-time equivalent) in neurology during the duration of
their subspecialty training.

3.1.11 In the last year of training the trainee is expected to sit for the Neonatology
Exam. Obtaining a pass in this exam is one of the prerequisites for entry into
register of Neonatology.
Figure 1. Outline of training timeline in Neonatology

- **FOUNDATION PROGRAMME**

- **BASIC SPECIALIST TRAINING**
  - MRCPCH or EQUIVALENT

- **HIGHER SPECIALIST TRAINING IN GENERAL PAEDIATRICS** (including first 2 years of *Neonatology* TRAINING)

- Remaining 2 years (year 5 and 6) in *Neonatology* subspecialty training
4. The training programme

4.1 Structure of the programme

This training programme is designed to ensure that the trainee acquires competencies in several key areas (as detailed below). Each trainee should be allocated to a mentor at the commencement of training and the mentor is responsible for the assessment and recording of competence. Certification of completion of specialist training in neonatology shall not be subject to a final assessment but will be the product of continuous mentoring and professional assessment as documented in the trainee’s portfolio.

4.1.1 Each area of competency set out below comprises a specific area of practice specific to neonatology and more general areas of competency, for example clinical governance and audit, should be catered for within the general training programmes of the institutions undertaking training. These areas as appropriate to the neonatologist can be identified from the curriculum. In addition to the training necessary to support the development of the competencies below, it is recommended that trainees develop expertise in specific areas relevant to the practice of Neonatology.

- Peri-operative care in neonatal surgery
- Foetal medicine
- Basics of paediatric intensive care

4.2 Key competencies in neonatology

4.2.1 Resuscitation: The trainee will be able to institute and lead neonatal resuscitation both of the term and preterm baby. The trainee must have demonstrated a full understanding of the physiology and treatments involved and have a detailed and up-to-date knowledge of current ERC and ILCOR resuscitation guidelines.

4.2.2 Neurology: The trainee will demonstrate proficiency at clinical assessment. Investigation (including cerebral ultrasound scanning, cerebral function monitoring) and management of a range of neurological disorders, including preterm and term brain injury, neonatal encephalopathy, congenital malformations and seizures.

4.2.3 Communication skills and counselling: The trainee will demonstrate increasing skills in communication with parents and staff, both individually and as part of a
team, during their training. This includes experience at breaking bad news, handling perinatal death and discussing prognosis with parents

4.2.4 **Congenital anomalies and genetic disease:** The trainee will be able to recognise common congenital anomalies, to investigate babies with such lesions and to use literature and database searches to identify rare conditions and communicate such information to parents

4.2.5 **Cardiorespiratory intensive care:** The trainee will be able to institute and maintain full cardiorespiratory intensive care for preterm and sick term newborn babies. This will include a full working knowledge of the principles and application of a range of ventilatory modalities, of circulatory support and the trainee must be able to manage complications. In addition the trainee must be able to plan care for the baby with chronic respiratory disease and be aware of the potential long-term complications.

4.2.6 **Fluid balance, thermoregulation and renal failure:** The trainee will be able to initiate and manage the thermal environment of preterm and term babies, and manage fluid balance in such babies, demonstrating a full understanding and knowledge of the underlying physiology - with special reference to the rapid postnatal changes in body water distribution and transepidermal water loss. The trainee will be able to diagnose and initiate treatment of renal failure.

4.2.7 **Haematology and transfusion:** The trainee will be able to diagnose and manage the range of haematological disorders found in newborn babies. The trainee will be conversant with the full range of blood products available for transfusion and the appropriate use of each.

4.2.8 **Metabolism and endocrine disorders:** The trainee will demonstrate proficiency in the recognition, assessment, investigation and management of the more common and important metabolic and endocrine disorders.

4.2.9 **Nutrition, feeding, gastro-intestinal and hepatic disease:** The trainee will understand the importance and principles of neonatal nutrition and be able to provide comprehensive nutritional support to well and sick newborn babies, including the recognition and treatment of common complications; the trainee
will be able to recognise both common congenital gastro-intestinal and hepatic anomalies and acquired neonatal disease.

4.2.10 Immunity and infection: Understand the development of immunity and the vulnerability of the newborn to infection

4.2.11 Family care and care of the well newborn baby: The trainee should have a wide knowledge of normal development, common minor problems and morphological variation and the importance of communication with other health care professionals and the parents.

4.2.12 Ward Organisation / Management Skills / Clinical Governance: The trainee will have demonstrated skills at leading clinical rounds, be able to carry out the administrative duties required to run a neonatal unit and will have organised and attended perinatal meetings and unit meetings.

4.2.13 Developmental care: The trainee should understand and demonstrate the use of a range of medical and nursing interventions to decrease the stress of preterm neonates in neonatal intensive care units.

4.2.14 Transport of the newborn baby: The trainee will be competent in the organisation of a neonatal transport service and in the retrieval and transport of the sick newborn baby and will be able to teach others to carry out transfers.

4.3 Recording of progress

Each trainee should maintain a portfolio which includes a record of the evolution of competency. This will be completed by the trainee and mentor who will both sign the trainee off at the requisite level annually.

In addition the portfolio should comprise:

- Evidence of completion of other key areas of the curriculum,
- Reflective notes covering each of the defined key competency areas based on a single case for each area. These should be kept brief and be read by, discussed with and appraised by the supervisor.
- Evidence of attendance at a minimum of one regional/national/international academic meeting or course each year, with a description of the learning points attained.
- A record of continuing professional educational activities undertaken, other than the above, including locally organised educational opportunities.
 Copies of abstracts submitted and publications achievement during the trainee’s career.
 Reports of audits performed by the trainee (alone or as part of a team).
 Evidence of certification for courses claimed in the assessment framework.

4.4 Monitoring of training

The neonatal programme director will designate a neonatologist as mentor or supervisor to each trainee at the beginning of the training programme. In the absence of an officially designated neonatal programme director this task will be undertaken by the clinical chairperson. The mentor, with or without the programme director, provides advice to the trainee on important training issues and reviews the trainee’s progress at least at yearly intervals.

The trainee maintains a personal portfolio as described above, where she/he documents relevant training experiences. This portfolio and the trainee's progress through various levels of competency are regularly reviewed by mentor and trainee. Successful achievement of competency is certified by the neonatologist mentor. The MPA will for each trainee maintain a record of:

 The duration of training
 The centres in which the trainee received education and training
 A record of the acquired knowledge, skills and practical experience accumulated by the trainee
5. Training requirements

5.1 Training centres

The official training centre for the Maltese Neonatal Training Programme is the Neonatal Paediatric Intensive Care Unit (NPICU) of Mater Dei Hospital (MDH), Malta. This unit will aim to achieve and maintain training standards as detailed by the European Society of Neonatology, in collaboration with the Paediatrics Section of UEMS.

5.2 Trainers

The MPA will appoint a neonatologist to act as a lead clinician in neonatal training. The lead clinician is responsible for developing the prospectus for a training programme, for identifying, supervising and allocating mentors to trainees. He/she should also meet regularly with trainees and coordinate feedback for the training programme.

5.3 Mentors

These individuals should hold a staff neonatologist post at an accredited training Neonatal Intensive Care Unit. Such individuals should undertake continuing professional development to equip them with the necessary skills to undertake the role. They have a duty to the trainees under their supervision to meet regularly with the trainee, to make assessment of their competence and to act as an advocate for the trainee to ensure that the individual obtains the optimal training opportunity from the programme.

6. Awarding of CCST in Neonatology

Entry into the specialist register in Neonatology requires fulfilment all of the following:

1. All the criteria of the training programme/curriculum are satisfied, documentation of training in the e-portfolio is complete and the trainee passes all appraisals during the period of training.
2. The bulk of the training in neonatology (>50% of HST duration) is undertaken in a recognized institution within the territory of the Republic of Malta.
3. The trainee undertakes the last 6 months of his/her training in a recognized institution within the territory of the Republic of Malta.
4. The trainee passes the neonatology examination.
5. The trainee has undertaken a period of training in a recognized tertiary centre abroad lasting not less than 1 year and not more than 2 years duration.
6. The trainee shows evidence of participation in research, achieved a minimum of 1 publication in a peer reviewed journal, and contributed presentations in local and international scientific meetings relevant to the subspecialty.