European Society for Paediatric Research

EAP

European Requirements for Training in Neonatology.

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Paediatric Section of the Union of European Medical Specialists and

the European Board of Neonatology (EBN)

PREFACE

Paediatrics is an independent medical specialty based on the knowledge and skills required for the prevention, diagnosis and management of all aspects of illness and injury affecting children of all age groups, from birth to the end of adolescence, up to the age of 18 years. It is not just about the recognition and treatment of illness in babies and children. Instead, Paediatrics also encompasses child health, which covers all aspects of growth and development, and the prevention of disease. The influence of the family and environmental factors also play a large role in the development of the child. Many conditions require life-long management and follow-up before a smooth transition of care to adult services.

This document sets out to define the minimum requirements for training in Neonatology. Neonatology is a branch of Paediatrics and formally recognised as such by the EAP, itself a section of the Union of European Medical Specialists (Union Européenne des Medicins Specialistes - UEMS) through the European Board of Paediatrics (EBP).

This training curriculum has been developed to support national training programmes in Neonatal Medicine, one of the Paediatric Specialist training programmes as defined by the EBP-UEMS. The new edition replaces the 1st and 2nd editions of the Syllabus prepared by the ESPR Working Group for Neonatology, formally approved in 1998 and 2007, respectively. This substantive revision took place to update the training components to modern day clinical work patterns and administrative realities. We have striven to make the modern process of training in Neonatology following the core-training in Paediatrics transparent and, at the same time, to facilitate the incorporation of high-quality national training programmes that were not easily reconciled with the proposed modular system of the curriculum.

For these reasons, we believe that all doctors whose practice involves to a large part the medical care of children requires a solid basic training in General Paediatrics, as set out by many National Training Authorities (NTAs) and in the recommended European Common Trunk Syllabus, approved by the EAP-UEMS. The basic training, which should be of 3 years minimum duration, should act as a prelude to specialist training and underpin many of the principles set out in this specialist syllabus. The specialist neonatal training period should equally be of 3 years. This is required so that individual EU countries can

move towards delivering this curriculum in the interest of training competent practitioners in neonatal medicine and to provide Pan-European consistency. European NTAs may choose to integrate the first of three years of specialist neonatal training into the local core paediatric training curriculum.

Composition of the syllabus subcommittee

The committee for the update of the European Requirements for Training in Neonatology 2021 consists of board examined specialists in neonatal medicine with extensive experience at senior staff level, all being experienced neonatal educators with extensive knowledge in policy development and members of the European Society for Paediatric Research (ESPR), as per appointment by the UEMS. The writing group members are the President of the ESPR, Associate Professor Dr Charles C. Roehr (writing group chair), the Chairperson of the European Board of Neonatology (EBN), Professor Dr Maximo Vento, and the EBN Officer of Education and Training, Associate Professor Dr Tomasz Szczapa. Representatives from over thirty European neonatal societies and members of international parent organisations were consulted before the completion of the syllabus.

Methodology for generating the training requirements

The process of generating the training requirements included the adaptation of existing European policy documents on training requirements, the 2nd Edition of the European Training Requirements for Training in Neonatology (Version 2007), national European syllabi and also recently-published, by an international collaboration, European Standards of Care for Newborn Health (www.newborn-health-standards.org). Furthermore, through the initiative of the EBN, consultations among representatives of European national neonatal societies were sought to actively contribute items for inclusion in the syllabus to ensure international applicability. Thus, the result is a true Pan-European training syllabus for neonatal training, including suggestions suitable for countries throughout Europe independently of their level of income.

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INTRODUCTION

In order to achieve high standards of both patient care and scientific research in the field of medicine, high quality postgraduate training programmes are indispensable. One of the endeavours of the Union of European Medical Specialists (UEMS) and the European Board of Paediatrics (EBP), the Paediatric Section of UEMS, is to promote training programmes in Paediatrics and its recognised subspecialties of equivalent quality in the various member countries throughout the European Union (EU). Because of the rapid integration of these countries, doctors can now freely practice medicine throughout the EU. It is therefore of prime importance for the maintenance of standards of patient care that specialist doctors should receive equivalent training in each of the member countries.

Neonatology is a highly technical and rapidly evolving area of paediatric medicine, which is established as a paediatric subspecialty in most European countries. In different countries the form and duration of the training, as well as process for accrediting training centres and monitoring the quality of training, vary markedly.

Next to the care for preterm infants and otherwise compromised babies, Neonatology encompasses the care for healthy newborn babies, which includes the clinical examination and prescription of recommended prophylactic medication or appropriate newborn screening tests. Neonatal medicine further includes the pre- and postoperative care for infants with surgical, neuro-surgical and congenital heart disease, as well as acutely ill patients. Finally, specialists in Neonatology recognise the needs of the parents and families of newborn infants as a whole and care for these compassionately. Neonatologists utilise a multi-disciplinary team of doctors and nurses from different specialities, psychologists and other allied health care professionals and social workers to improve the physical and mental conditions in which families with an unwell infant find themselves. This ultimately includes the care for the dying sick neonate at all gestational ages and knowledge of providing appropriate palliative treatment

We believe that this curriculum and assessment framework may be utilised to:

- Optimise health care for the neonate;
- Harmonise training in Neonatology between different European countries;
- Establish clearly defined standards of knowledge and skills required to practice Neonatology at a tertiary care level;
- Foster the development of a European network of proficient tertiary care centres for Neonatology;
- Through these measures, the curriculum and assessment framework aim to:
    - improve the quality of care for severely ill newborn babies, and
    - enhance European contributions to international scientific progress in the field of Neonatology.

This document defines the aims of training, the content and the duration of the training programme, the basic requirements for entering such a programme and a spectrum of required qualifications for training centres and tutors.

1. OUTLINE EUROPEAN NEONATAL SUBSPECIALIST TRAINING SYLLABUS, v3, 2021

1.1 Aims of higher training

The training provided should equip the doctor with the necessary knowledge, skills (procedure-related), competences (solving problems or managing situations) and attitudes required to practice high-quality neonatal medicine. The aim is to define the minimal level of detailed specialist knowledge of neonatal medicine and minimal mandatory practical skill sets and competences as the common denominators for practicing neonatal medicine at subspecialist level in neonatal units, under consultant supervision, to enable unrestricted professional movement of medical professionals throughout the European Union (EU).

1.2 End result of training

The end result of training is defined as being able to practice largely independently as a neonatal subspecialist doctor. National regulations will specify whether the specialist may practice fully independently or whether a degree of consultant supervision is required until full consultant level, according to national guidance, which may require training exit examinations etc. Therefore, the minimum denominator of completeness of training is defined as the recognition of the particular needs of newborn infants in accordance to their gestational age and disease progression. With completion of training, the neonatal specialist doctor should be capable of identifying the infant in need of medical attention, to formulate a diagnosis and set of differential diagnoses, a plan for appropriate investigations and, based on the results of these investigations, be able to formulate a concise treatment plan. It is expected that by the end of training, the neonatal subspecialist doctor has a clear understanding of the complexity of neonatal illnesses and their often-varied presentation. It is expected that diagnostic tests can be ordered or performed in person, as much as the results be independently interpreted. Further, the doctor with completed training in Neonatology is expected to acknowledge their own limitations and be confident to discuss the patient with a multi-disciplinary team of colleagues from other paediatric subspecialties to formulate a concise treatment plan. Completion of training also signifies that the neonatal subspecialist doctor recognises and helps resolve the social and psychological needs of families. The neonatal subspecialist also acknowledges and values the involvements of parents as partners in care and their role in shared responsibility for the wellbeing of the child. Recognition of the, sometimes ultimate, futility of medical intervention, leading to a change of direction of care from treatment to palliative care, is also expected.

1.3 Training period

Doctors whose practice involves to a large part the medical care of children should complete a basic training in General Paediatrics of at least 3 years, in accordance to the European Union of Medical Specialists the European Union of Medical Specialists training syllabus for Paediatrics (UEMS 2015). This basic paediatric training must be completed before the completion of the subspecialist neonatal training. For the completion of the subspecialist neonatal training, the training period is 3 years (36 months) of full-time equivalent training, including night and weekend work.

1.4 Quality improvement and research training

We recommend that trainees in subspecialist neonatal training should have contributed to quality improvement projects, have independently performed clinical audit (with senior supervision) and,

preferentially, devoted a period of time out of clinical training for conducting a dedicated research project. Training in methods and practice of evidence-based practice should be mandatory. Trainees should be familiar with using the PICO approach (patient, intervention, comparison, outcome) to define the key words for a (re-)searchable clinical scenario. Participation in, for instance, the NOTE (Neonatal Online Training and Education) Programme, EBN (European Board of Neonatology, former European Society of Neonatology) Teaching Courses or ESN (European School of Neonatology) educational offers as well as courses related to quality assessment and improvement, searching the scientific literature, designing a clinical trial is desirable. Trainees should be familiar with methods of effective literature search in electronic databases and the critical appraisal of medical literature and its applicability to clinical practice.

1.5 Requirements for training institutions

The recognition of training institutions will ultimately be part of a joint process involving NTAs, EBP-UEMS and the competent specialist society. It is anticipated that the ESPR/EBN will act as the agent for EBP-UEMS and UEMS in executing this task. A list of the names and characteristics of existing national training centres will be created and held by the EBN and EAP/EBP-UEMS, which will oversee quality assurance of the recognised centres at periodic intervals every 5 years using the guidelines suggested by the UEMS.

1.6 Accreditation of centres

For each EU Member country, a list of centres, units, training directors, tutors and teachers should be compiled and updated on an annual basis. Each centre is characterised by the available modules, for instance point-of-care diagnostics, ECHO or ultrasound training facilities, etc., or areas of other teaching activity, as well as the number of tutors and teachers available and the size of the clinical practice as defined by the needs of the trainee.

Accreditation will initially be given by the NTA and ultimately be approved by EAP/EBP-UEMS. The approval process will follow EU Guidelines (currently in preparation). At present, the EAP will review National Inspections and EBN will act as arbiter in situations of disagreement.

1.7 Full training centre

A training centre can be a single institution or a group of related establishments. The centre should provide a wide breath of experience in the field of neonatal medicine, including emergency care. A minimum of 12 months in a maximum care level perinatal centre to gain experience with immediate postnatal stabilisation of compromised term and preterm infants is expected. The centre is expected to provide tuition and, ideally practical exposure, on all levels of neonatal medicine. This includes training in perinatal and newborn physiology and pathophysiology of newborn disease, organ system specific diagnostic and therapeutic management, parent-patient management, organisation of ongoing paediatric care and also palliative care. The number of training activities should be sufficient to provide at least a minimum experience for a trainee to practice largely independently with consultant supervision.

A group of related establishments can be considered a centre and each component considered as a unit contributing one or more modules. The centre should have easy access to, and close relationships with, other relevant specialities. Demonstration of involvement of other care teams particularly specialised nurses, paediatric nutritionists, physiotherapists, social workers, paediatric surgeons and psychologists is

essential for recognition. The centre should ideally provide evidence of on-going clinical research and access to basic science research. In countries that have approved centres for neonatal care then the Full Training Centre must be one of these. The centre will be responsible for weekly clinical staff/seminar teaching and participation in regional/national meetings. Basic textbooks in Neonatology should be freely available and there should be easy access to a comprehensive reference library either in paper or electronic format.

1.8 Training unit

Training units are institutions that provide training in one or more aspects and areas of neonatal care such as: Paediatric surgery, neuro-surgery and paediatric cardiac surgery. It is further recommended that the training unit has access to other paediatric specialist services, including paediatric radiology, paediatric cardiology and paediatric neurology and endocrinology. They should provide adequate exposure in the defined area and a teacher who is deemed competent in these areas.

A detailed summary of requirements for training centres is given in 7.2.

2. REQUIREMENTS FOR TRAINING IN NEONATOLOGY

The Training Programme Director (TPD) must have been practising Neonatology **for at least 5 years**. The training staff in a centre must include at least one additional trainer qualified in Neonatology with subspecialist accreditation.

Ideally, there should be additional trainers to provide training across all aspects of the speciality. When an aspect of training cannot be provided in one unit it will be necessary for the trainee to be taught at another suitable centre by a trainer approved for that purpose.

A trainer is a person who holds acknowledged expertise in one or several aspects and clinical areas of neonatal medicine. This person's contribution may be restricted to these areas of expertise. Both educational supervisors and trainers must have independently practised Neonatology for a **minimum of 3-4 years**.

Trainers should work out a structured training programme for the trainee in accordance with the trainee's own qualities and the available facilities of the institution. Regular review will be required to allow for flexibility and for early identification of problems/deficiencies. The trainer should work with the trainee to create a Personal Development Plan (PDP).

Trainers are expected to provide formal appraisal and assessment of progress. Appraisal consists of determining what is needed and what evidence is required to show that this has been achieved. Assessment evaluates progress against objectives. Trainee assessment should be provided in terms of:

- Training and career ambitions
- Training experience related to syllabus
- Achievements related to current plan

In order to provide a close personal monitoring of the trainee during his/her training, the number of trainees should not exceed the number of trainers in the centre.

Trainers will meet the trainee at the beginning of the programme to define the educational contract for that trainee. Reviews of progress should take place at three-monthly intervals during the first year of training to appraise the individual. A structured, written account of these meetings, with particular emphasis on the initial, mid- and end-of-training meetings, is advised.

An annual assessment should be undertaken, ideally at a national level, to review competencies achieved and to allow progress within the teaching programme. Assessments should be detailed and contain statements of theoretical and practical experience accumulated by the trainee. It is expected that the trainee will also provide an account of the training received and problems encountered (portfolio). Reports will be submitted to the TPD or national body.

3. REQUIREMENTS FOR TRAINEES

3.1 Prerequisites of trainees

The trainee should have completed core training in paediatrics: i.e. common trunk of a minimum of 3 years before commencing subspecialist training in Neonatology.

3.2 Additional requirements of trainees

In order to gain the necessary depth of experience each trainee should be actively involved in the management care of a range of patients during the whole period of his/her speciality training. This should include the care (as appropriate) of outpatients, inpatients (including emergency admissions) and community care.

Many countries are currently reforming their postgraduate medical education. New pedagogic initiatives and blueprints have been introduced to improve quality and effectiveness of the education in line with outcome-based education, for example using the CanMEDS framework. Competency-based assessment, as an adjunct to knowledge assessment and portfolio completion, is an important aspect of evaluation.

CanMEDS identifies the following competencies

- Medical expert: integrates all CanMED roles applying medical knowledge, clinical skills and professional attitudes.
- Communicator: effectively facilitates doctor-patient relationship and dynamic exchanges before, during and after medical encounter
- Collaborator: effectively works within healthcare system to achieve optimal patient care
- Manager/integral participant in health care organisations: allocates resources and contributes to health care system
- Health advocate: responsibly uses expertise and influence to advance the health of individual patients, communities or populations
- Scholar: demonstrates lifelong commitment to reflective learning and to creation, dissemination, translation of medical knowledge
- Professional: commits to the health and wellbeing of individuals and society through ethical practice, professional led regulation and high personal standards of behaviour.

Log-book

The trainee should keep a log-book of patients they have seen, procedures conducted, diagnosis and therapeutic interventions instigated and followed-up. This will constitute part of their portfolio. Electronic versions of the portfolio and log-book are preferred.

The trainee will be required to keep his/her personal log-book or equivalent up-to-date according to national guidelines and EU directives. The log-book must be endorsed by his/her trainer or authorised deputy. The trainee should attend and provide evidence of attendance at local, regional and national meetings.

Attendance at international professional, scientific meetings is considered essential for neonatal specialist training. It is recommended to present posters and/or give presentations at these meetings. Attendance at summer schools or other educational training schools is generally expected and strongly encouraged.

Competency assessment

Competencies should be evaluated throughout the training period. There are a number of different tools for this, describing different aspects of training. Some of these are set out below with a recommendation for the number that should be completed during each year of training. Formal and informal reflection on these assessments is an important aspect of their success (please see '**Table 2: Competency assessment**' for further information).

Knowledge base

As a proposal, examinations can follow the below format:

1) Evaluation of practical abilities as described in the log-book. The log-book should be either bi-lingual, in the national language and in English, or in English used as a lingua franca.
2) Theoretical multiple response questionnaire
3) Solution of a practical case
4) Research interests and performance, as assessed by presenting the citation and a copy of presented posters and/ or published articles

Participation in audit projects

The trainee should conduct at least one systematic style review of a topic, and, in addition, do a critical appraisal of a research paper, prepare a detailed evidence-based appraisal of a diagnostic test or a therapeutic intervention.

4. CONTENT TABLE

4.1 Core neonatal skills and competences

Trainees will be expected to have acquired extensive skills and competences in the below domains

4.2.1 Practical procedures: Stabilisation and resuscitation of the newborn with particular regard to maintenance of temperature, timing of cord clamping, airway management, facemask ventilation, tracheal intubation, laryngeal mask airway (LMA) insertion and techniques of artificial ventilation, oxygen supplementation and physiologic monitoring. Insertion of arterial catheters (umbilical and peripheral), establishment of intravenous infusion and percutaneous insertion of long intravenous lines. Indication, prescription and monitoring of blood component transfusions.

Ultrasound guided techniques: arterial puncture, needle aspiration and pleural drainage of pneumothorax, suprapubic aspiration of urine, lumbar and ventricular puncture.

4.2.2 Diagnosis: Ordering and interpretation of common laboratory and micro-biological investigations, including blood gas analysis and metabolic tests. Interpretation of neonatal X-Ray examinations, such as standard chest and abdominal radiological investigations. Role and indication of specialised investigations, e.g. MRI, CT. Experience in performing and interpreting cranial ultrasound examination of the nervous system, focussing on the identification of major intracranial abnormalities and haemorrhages, as well as the abdominal organs, and of congenital hip dysplasia is expected. Use and interpretation of the results of EEG, cortical evoked responses and neuromuscular electro-physiological tests. Application of neuro-monitoring devices such as amplitude-integrated electroencephalography /multichannel EEG and near infrared spectroscopy (NIRS) cerebral tissue oximeters.

4.2.3 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.

4.2.4 Structured clinical hand over: For clinical hand over of patients, a clear structure should be trained and followed. The SBAR format (Situation, Background, Assessment, Recommendation) is advised as the gold standard for clinical handovers.

4.2.5 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, including resuscitation team debriefing. Co-operation and consultation with other medical specialists.

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

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

4.2.8 Ethics: The trainee should be educated in the ethics around end-of-life decisions in accordance to the national laws, including respecting parental wishes, providing family guidance, specifics of tailored pharmacotherapy, utilising hospice facilities and palliative care specialists, etc.

4.2 Additional skills (including non-technical skills)

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 should equip the trainee with the personal and non-technical skills necessary to fulfil these roles, for example:

- Counselling
- Management
- Leadership
- Clinical governance and audit
- Statistical and interpretative skills
- Decision-making
- Situational awareness
- Team working

These skills should be acquired as part of the situated competences.

5. EXAMINATIONS

At present, there are no centrally-administered examinations across Europe to licence practice as a neonatologist. Several European member states currently have such certification at national level. The training described in this document merely underpins this process and we anticipate these processes will be recognised. Individuals holding their national Certificate of Completion of Specialist Training (or equivalent) are eligible to work in other EU states. The process described in this document is intended to provide a framework whereby there may be confidence in the training of neonatologists in each member country.

6. TRAINING PROGRAMME

6.1 Structure of the programme

The precise training programme will vary from centre to centre. We recommend that the programme be designed to ensure that the trainee acquires competencies in several key areas (see below). Each trainee should be allocated to her or his trainer at the commencement of training. The mentor is responsible for the assessment and recording of competence. In some countries final certification in Neonatology is undertaken, but this is not mandatory and should not replace the process of mentoring and professional assessment.

Each of the below areas of competency comprises an area of practice specific to Neonatology. The more general areas of competency, for example ward organisational skills, clinical governance and audit, should be embedded within the general training programmes of the institutions undertaking training. These areas should be identified from the local curriculum. In addition to the training necessary to support the development of the competencies below (see 6.4), it is recommended that trainees develop expertise in specific areas relevant to the practice of tertiary Neonatology, for example:

- Peri-operative care in neonatal surgery and neonatal cardiac surgery
- Fetal medicine
- Clinical genetics

- Organisation and conduct of specialist follow-up clinics

6.2 Duration of the training

6.2.1 The recommended minimum training period as a neonatal specialist is 3 years (following common trunk paediatric training of 3 years). It is strongly recommended that at least one year of neonatal training should be in a tertiary academic centre and that all levels of neonatal care (i.e. intensive care, high- and low-dependency care) are all encountered to gain proficiency in the above-mentioned knowledge base and procedural skills (see sections 4.1. and 4.2).

6.2.2 Training may include periods of attachment at other units for the acquisition of specific skills not available at the primary training institution.

6.3. Monitoring of the training

6.3.1 The neonatal TPD will designate a neonatologist trainer as a supervisor to each trainee at the beginning of the training programme. The trainer, with or without the TPD, provides advice to the trainee on important training issues and reviews the trainee's progress at least at yearly intervals.

6.3.2 The trainee maintains a personal portfolio (including the assessment framework) 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 (we suggest 3 monthly intervals). Successful achievement of competency is certified by the neonatologist trainer. Accompanying the assessment framework, the certification should be detailed and state:

- The duration of training,
- The centres in which the trainee received his/her education,
- Acquired knowledge and skills, and accurately quantify extent of theoretical and practical experience accumulated by the trainee over and above that recorded in the assessment framework.

6.3.3 We recommend that each national body maintains a register of trainees and provides or is provided with suitable certification of satisfactory training. Furthermore, we suggest that national bodies develop systems for the regular review of neonatal training centres using suitable measures such as the minimum scheme, as recommended in the Appendix 1.

6.4 Key competencies in Neonatology

6.4.1 Family care and care of the 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.

6.4.2 Transport of the newborn baby: The trainee will be competent at retrieval and transport of the sick newborn baby and will be able to teach others to carry out transfers.

6.4.3 Immunity and infection: The trainee will understand the development of immunity and the vulnerability of the newborn to infection. Knowledge of basic microbiology with familiarity of relevant pathogens and their antibiotic susceptibility, of antibiotic resistance and stewardship is expected, including maternal and newborn immunisation.

6.4.4 Neurology: The trainee will demonstrate proficiency at clinical assessment. This includes investigation (including cerebral ultrasound scanning) and management of a range of neurological disorders, including preterm and term brain injury, congenital malformations, intracranial trauma and seizures. Trainees should be confident in the indication and provision of therapeutic hypothermia for infants at risk of hypoxic-ischaemic encephalopathy (HIE). Knowledge of interpreting amplitude integrated electro-encephalograms (aEEG) is desirable, as well as a working knowledge of interpreting magnet resonance imaging (MRI) images of intra-cranial structures, for instance to look for signs of effect of hypoxic ischaemic encephalopathy (HIE).

6.4.5 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.

6.4.6 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.

6.4.7 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 components available for transfusion and the appropriate use of each.

6.4.8 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, indication and provision of short-term and long-term intravenous and inhaled pulmonary vasodilators, and management of cardio-respiratory complications. In addition, the trainee should be able to formulate a care plan for the baby with chronic respiratory disease and be aware of the potential long-term complications. Trainees are strongly encouraged to learn functional echocardiography.

6.4.9 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.

6.4.10 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.

6.4.11 Resuscitation/stabilisation: The trainee will be able to institute and lead neonatal resuscitation/ stabilisation both of the term and preterm baby and to distinguish between interventions that are needed to restore vital organ functions (resuscitation) or to support transition (stabilisation). The trainee should have presented the knowledge of the latest European Resuscitation Council (ERC) / International Liaison

Committee on Resuscitation (ILCOR) Guidelines, necessary practical skills, and demonstrated a full understanding of the physiology and treatments involved. Trainees are encouraged to take part in standardised courses of neonatal resuscitation offered by their institutions or other bodies (e.g. ERC Newborn Life Support (NLS), European School of Neonatology, NOTE or EBN courses). They should also know criteria for the application of therapeutic hypothermia and be able to use it appropriately in the post-resuscitation care.

6.4.12 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, unit meetings and clinical governance meetings.

6.4.13 Structured clinical hand over: For clinical hand over of patients, a clear structure should be trained and followed. The SBAR format (Situation, Background, Assessment, Recommendation) is advised as the gold standard for clinical handovers.

6.4.14 Communication skills and counselling: The trainee will acquire adequate 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.

6.4.15 Ethics: The trainee should be competent in the basic ethics of newborn medicine, the recognition and practice of treatment at the threshold of viability, end-of-life care decisions, etc. in accordance to the national laws.

6.5 Experiences in other areas

It is advised that the trainee develops expertise in more detail in one of the areas covered by competency (for example transport, metabolic disease, nutrition), the mandated areas listed above (4.1: Neonatal Surgery and/or Neonatal Cardiac Surgery, Fetal Medicine, Follow-up and Clinical Genetics) or develop expertise in areas not covered, for example paediatric cardiology or an area of relevant research. We strongly advise individuals to develop 'special interests' throughout their three-year training programme (on which they may wish to concentrate for up to 12 months of training, or following the completion of a two-year programme).

6.6 Recording of progress

An educational portfolio registers a student's cumulative educational activities and learning outcomes over time. In specific, through an assessment framework, it records his/her academic, professional and personal progress. We recommend that each trainee develops such a portfolio incorporating the assessment opportunities listed under point 10. The portfolio will be curated jointly by trainee and mentor. The latter will also be in charge of signing off the trainee at the requisite level annually. The portfolio should comprise the components listed in section 10 – **Table 1: Recording of progress – portfolio components.**

7. TRAINING PROGRAMMES

7.1 Training programmes

We recommend that institutions that wish to provide neonatal subspecialist training develop a prospectus detailing the proposed plan of for their training programme. This should include details of how experience

in key or mandatory areas is to be obtained and in which units. Training programmes may comprise experience of more than one neonatal centre, indeed this is encouraged so that the trainee is exposed to different styles of neonatal care. For example, the prospectus may indicate where the candidate will receive experience, for example, in fetal medicine or neonatal surgery or pre-/post cardiac surgery care, if these are not available in the host institution.

7.2 Training centres

Individual training centres are defined by their ability to provide well supervised training content and the availability of teachers. Each training centre should seek accreditation as such from its national body. If this is not available the EBN, in collaboration with the Paediatric Section of UEMS, will provide a scheme whereby such institutions may register their ability to train individuals centrally. Several institutions, located in close proximity, may contribute to a training programme. In such a case, one qualified individual should be designated as training programme director with overall responsibility for the offered programme. The key features of a suitable training centre are set out in Appendix 1.

7.3 Trainers

7.3.1. Each neonatal training programme must identify a Programme Director. This individual will usually be a senior neonatologist in an academic centre and a committed teacher. The Director should have teaching experience, documented in form of a teaching assignment to a local university. The Programme Director is responsible for developing the prospectus for a training programme, for identifying, supervising and allocating mentors to trainees (the Director may undertake this role him/herself). He/she should also meet regularly with trainees and coordinate feedback for the training programme.

7.3.2. For each EU member state, a list of training programmes, training centres and programme directors should be compiled and updated on an annual basis. This may be facilitated by the EBN and EBP. Each centre is defined by the available modules and trainers. Accreditation is given by the EBP, based on recommendations of the national guidelines of the country. EBP ensures that the national guidelines of a European country meet or exceed the minimal requirements of the training programmes and training centres as defined in sections 3 and 5.

8. CROSS CUTTING SKILLS AND TOPICS

Trainee neonatologists should acquire detailed knowledge of the below cross cutting skills:

8.1.1 Epidemiology and statistics: 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. Statistical methods applied to biomedical science allowing to analyse epidemiological information, and design and evaluate scientific information.

8.1.2 Pathophysiology of the foetus: Fetal 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 fetal anomalies and collaborative prenatal counselling. Evidence-based perinatal therapies for known foetal conditions and improving outcomes of, for example, preterm birth.

8.1.3 Physiology of postnatal adaptation: Respiratory, cardiovascular and other physiological changes at birth, also in the context of potential interventions. Development of organ systems and physiological changes after birth. Physiology of breast feeding.

8.1.4 Pathophysiology of prematurity: Respiratory development and pathology including surfactant deficiency and its sequelae. Cardiovascular problems including recognition and treatment of patent ductus arteriosus or persisting pulmonary hypertension. Gastrointestinal development and feeding, renal maturation and fluid balance; pathogenesis of and risk factors for necrotising enterocolitis. Neurological problems, including pathogenesis of intraventricular haemorrhage and periventricular leucomalacia.

8.1.5 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.

8.1.6 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.

8.1.7 Principles of neonatal care: Theory and organisation of resuscitation/stabilisation based on the up-to-date European Resuscitation Council (ERC) / International Liaison Committee on Resuscitation (ILCOR) guidelines. Delivery room set-up following and debriefing following the Delivery Room Intensive Care Unit (DRICU) concept. Conceptual and interpretation of SpO_2 and heart rate monitoring using pulse oximetry according to timing after birth. Individual titration of the inspired fraction of oxygen (FiO_2) according to the SpO_2 nomogram for term and preterm infants. Principles of non-invasive ventilation in the delivery room (DR). Drug management in the DR. Ethical aspects of resuscitation. Respiratory care, including adequate provision of ongoing non-invasive respiratory support and mechanical ventilation, endotracheal intubation and delivery of respiratory support. Management of complications and long-term sequelae of prolonged neonatal ventilation. Management of hyperbilirubinaemia, including indication for, and how to set up, an exchange transfusion. Cardiovascular support, assessment of cardiovascular system including need assessment for addressing treatment of a patent arterial duct. Postnatal growth, breast feeding, role of milk banks in the NICU, composition and use of dietetic formulae and supplements. Assessment of fluid balance and nutritional requirements, provision of adequate nutrition and monitoring of postnatal growth, primary promotion of breastfeeding, provision of own mother's and donor milk, fortification, composition of dietetic formulae. Parenteral nutrition, prescription, administration and indications.

Assessment, diagnosis and management of severe enteral diseases. Neonatal skin and thermal care. Assessment of fluid balance and nutritional requirements. Assessment of bone mineralisation. Assessment of structural and functional integrity of the brain using clinical examination and special investigations. Prognosis of major neuropathology, screening preterm and 'at risk' babies for retinopathy and hearing loss. Diagnosis and assessment of congenital abnormality and dysmorphology. Investigation of suspected inborn errors of metabolism. Use of genetic investigations and diagnostic aids.

Routine care of the newborn in relation to jaundice, breast feeding, infections. Screening for neonatal disease by examination and investigation. Early, medium term and late sequelae of neonatal and perinatal events and ethical issues in neonatal care.

8.1.8 Follow-up of high-risk infants: Outcomes associated with perinatal high-risk groups (e.g.

prematurity, fetal 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.

8.1.9 Ethical issues and legal problems: including National and European practice

For more information, please see **Table 3: Key neonatal competences**.

9. SPECIALTY SPECIFIC SKILLS AND PRINCIPLES

The specialty specific skills for Neonatology are summarised in **Table 4: Summary of principles Neonatology**. Please refer to that section of the document found below.

10. TABLES

TABLE 1: Recording of progress – portfolio components

Assessment Category	Summary	Assessment Opportunity
Evidence of completion of key domains	Experience in neurological and developmental assessment, of neonatal surgical conditions and working understanding of principles of fetal medicine.	- to provide evidence of completion of key areas of the curriculum. - to implement a theoretical multiple-response questionnaire. - to show ability to manage practical cases.
Reflective notes covering competency domains	Reflective notes covering each of the defined key competency domains, based on a single case for each domain and suitably referenced. These should not be longer than two sides of A4 (10 point Arial type, 2cm margins; exclusive of references) and be read by, discussed with and appraised by their supervisor.	- to record reflective notes covering each of the defined key competency areas. - to prepare formal and informal reflections on competence assessments. - to keep an account of the training received and problems encountered. - to prepare statements of theoretical and practical experience accumulated by the trainee. - to keep log-book of patients seen, procedures conducted, diagnosis and therapeutic interventions instigated and followed-up. - to evaluate practical abilities as described in the log-book.
Attendance of one regional, national and international event	Evidence of attendance at a minimum one regional and one national meeting annually, and one	- to attend international professional, scientific meetings. - to keep evidence of attendance at local, regional and national meetings.

	international academic meeting at least once every two years, with a description of the learning points attained.	
Record of continuing professional education	A record of continuing professional educational activities undertaken, other than the above, including locally organised educational opportunities.	- to document attendance of summer schools or other educational training classes.
Abstracts & Publications	Copies of abstracts submitted and publication achievement during the trainee's career (optional, however scientific activity of trainees should be strongly encouraged).	- to do an evidence-based appraisal of a diagnostic test or a therapeutic intervention. - to present posters and/or give presentations. - to prepare one systematic style review of a topic. - to conduct a dedicated research project.
Quality improvements & audits	Reports of completed quality improvement (QI) projects and audits performed by the trainee (alone or as part of a team) during training. Evidence of closed loop QI.	- to perform a clinical audit independently. - to contribute to quality improvement projects and audit during training. - to maintain reports of completed quality-improvement projects.
Evidence of certification for courses claimed	Evidence of certification for courses claimed in the assessment framework.	- to maintain a database or folder with diplomas or certificates obtained through the completion of courses.

TABLE 2: Competency assessment

Assessment	**Purpose**	**Method**
MiniCeX (Mini clinical examination)	Provides feedback on skills needed in clinical care.	Trainer observes a trainee examining a patient and explaining the management plan to the parents.
CbD (Case based discussion)	Assesses clinical reasoning or decision making.	Trainee presents a more complex case to the trainer and has a discussion about the evidence or basis for diagnosis or treatment.
DOPS (Directly observed procedural skills)	Assesses practical skills.	Trainee undertakes a practical skill whilst being observed.

LEADER	Focuses on leadership skills.	A trainee is observed leading a team (e.g. during a resuscitation).
HAT (Handover assessment tool)	Evaluates handover skills.	Structured handover (for instance following the SBAR format (Situation, Background, Assessment, Recommendation), hand-over situations are supervised and discussed.
DOC (Discussion of correspondence)	Assesses letter writing skills.	Clinic letters or discharges are reviewed and discussed.
MSF (Multi-source feedback)	Provides wider feedback on the performance of the trainee.	Confidential comments from a wide range of colleagues, patients and the trainee are sought.

TABLE 3: Key neonatal competences and procedures

	Knowledge	**Procedural skills**	**Cognitive and communicative skills**
Family care and care of the newborn baby	- knows the normal developmental milestones, developmental delay, morphological variations and the importance of communication with other health care professionals and the parents	- values the caregivers and families as partners in care - makes her-/himself available at appropriate times for face to face communications	- effectively communicates reg. reaching developmental milestones, developmental delay, morphological variations and means of support
Transport of the newborn baby	- knows physiological principles of retrieval and transport of the sick newborn	- effectively organises and performs retrieval of sick newborn infants	- effectively communicates with team and caregivers about needs for and practicalities / risks and benefits of newborn transfer
Immunity and infection	- knows principles of the developing immunity - knows principle of infection control and treatment of its compromise	- recognises signs and symptoms of compromised immunity - develops a clear care plan to prevent and treat newborn infants with compromised	- effectively communicates with caregivers and the patients' families reg. the presentation of newborn infants with compromised immunity and infection, incl. the treatment and anticipated outcomes

		immunity and infections	
Neurology	- recognition of common neurologic disorders of the newborn - neurological examination of the newborn infant - basic knowledge of disease specific tests	- cranial ultrasound - structured neurological examination of the newborn infant - lumbar puncture - basic ophthalmological examination - aEEG application and interpretation - recognition of MRI signs of major cerebral insults	- communication with parents regarding provided care
Fluid balance, thermoregulation and renal failure	- knows physiologic principles of the newborn infants' fluid balance, including fluid balance - knows principle of eu-glycaemia and its management - understands concept of renal maturity and drug toxicity and interaction - recognises renal failure	- formulates a detailed enteral and parenteral feeding plan - effectively manages neonatal hypo- and hyperglycaemia - effectively manages renal failure	- communicates effectively with parents and families
Nutrition, feeding, gastro-intestinal and hepatic disease	- knows the principles of neonatal nutrition, including the recognition and treatment of common complications	- formulates a clear feeding plan of the newborn infant - formulates a first response plan for infants with suspected common congenital gastro-intestinal and hepatic anomalies	- effectively communicates with team colleagues, specialists and families and caregivers
Haematology and transfusion	- diagnoses manages the range of haematological	- manages the range of haematological disorders	- effectively counsels parents regarding common haematological disorders, incl. anaemia and transfusion of blood products

	disorders found in newborn babies	- performs exchange transfusion - effectively consents caregivers regards blood product transfusions	
Cardiorespiratory intensive care	- knows the principles of of newborn cardio-pulmonary stabilisation - knowns principles of invasive and non-invasive respirator support - knows principles of circulatory support	- formulates a detailed care plan for cardio-pulmonary support - performs point-of-care echocardiography (ECHO)	- effectively counsels parents regarding disease specific presentation and prognosis of entity
Metabolism and endocrine disorders	- knowledge of pathophysiology of common and important metabolic and endocrine disorders	- effectively manages, as the first care provider, common and important metabolic and endocrine disorders	- communicates with the caregivers and families of infants with suspected metabolic and endocrine disorders
Resuscitation/stabilisation	- up to date knowledge of national resuscitation guideline - knowledge of measures to prevent temperature instability - knowledge of gestational age specific disease spectrum	- non-invasive ventilation - endotracheal intubation - Laryngeal mask airway (LMA) ventilation - umbilical line placement (UAC/ UVC) - thoracic drainage insertion / thoracic air aspiration - principles and practice of newborn transfer	- antenatal counselling - team communication during interpartum care - communication with parents during interpartum care - decision on progression or stopping life supporting care in critically compromised patients
Ward Organisation	- knows principles of ward organisation and team management	- leads ward rounds	- effectively communicates with colleagues, allied professionals and carers in the work context

Management/ Clinical Governance	- understands the concept of clinical government	- leads multi-disciplinary team meetings - performs clinical government reviews - prepares multi-disciplinary case reviews	
Structured clinical hand over	- knows SBAR format	- follows SBAR format	- effective communication with the team
Communication and counselling	- knows principles of effective communication - knowns gestational age specific progression of diseases	- demonstrates effective technique of breaking bad news, handling perinatal death and discusses prognosis with parents	- is able to reflect on infants disease progression and gestational age diseases entities
Ethics	competence in the basic ethics of newborn medicine	- effectively manages infants at the threshold of viability, incl. deliberating end-of-life care decisions - effectively identifies and manages basics for facilitating organ donation	- effectively communicates with colleagues, carers and families manages infants at the threshold of viability, incl. options for end-of-life care and organ donation

TABLE 4: Summary of principles Neonatology

Degree of knowledge required:

H = HIGH	Up to date scientific knowledge
B = BASIC	Specialty textbook

A	**BASIC KNOWLEDGE**	
1	Neonatal physiology with particular regard to postnatal adaptation/transition	B
2	Resuscitation/stabilisation algorithm	H

B	**BASIC SKILLS**	
1	Clinical examination	
2	CPR interventions (airway opening manoeuvres, facemask ventilation, chest compressions, etc.)	H
3	Structured clinical hand over	B
4	Communication skills and counselling	
C	**BIOSTATISTICS**	
1	Application of parametric and nonparametric statistics	B
2	Statistical modelling	B
4	Principles of screening and surveillance programmes	B
5	Study design	B
6	Audits	B
D	**MANAGEMENT SKILLS**	
1	Team management, including multidisciplinary ward rounds and supervision of individual team members	B
2	Chairing meetings and team participation	B
3	Appraisal and assessment	B
4	Health economics and service provision	B
E	**EDUCATION**	
1	Defining aims of teaching course/programme/lecture	B
2	Targeting different audiences	B
3	Preparation of teaching material	B
4	Distance based learning using web sites	B
5	Evidence appraisal	B
F	**NEUROLOGICAL DISORDERS**	
1	Preterm and term brain injury	B
2	Congenital malformations	B

3	Intracranial trauma	B
4	Seizures	B
G	**CONGENITAL ANOMALIES AND GENETIC DISEASE**	
1	Recognition of common congenital anomalies	B
2	Literature and database searches to identify rare conditions	H
3	Communicating information to parents	B
H	**CARDIORESPIRATORY INTENSIVE CARE**	
1	knowledge of the principles and application of a range of ventilatory modalities for acute and chronic lung disease	B
2	knowledge of the principles and application of circulatory support	B
3	indication and provision of short-term and long-term intravenous and inhaled pulmonary vasodilators	H
4	management of cardiocirculatory complications including vasopressor and inotropic support	H
I	**FLUID BALANCE, THERMOREGULATION AND RENAL FAILURE**	
1	Principles of thermal management	B
2	Management of fluid balance including renal dysfunction	B
J	Haematology and transfusion	
1	Management of anaemia and hyperbilirubinemia	B
2	Use of blood derivatives	B
	Metabolism and endocrine disorders	
	Investigation and management of the more common and important metabolic and endocrine disorders	B
	Nutrition, feedings, gastro-intestinal and hepatic disease	
	Principles of enteral and parenteral nutrition	B
	Recognition of congenital or acquired gastro-intestinal complications	B
	Immunity and infection	

	Recognition and adequate treatment of the newborns' specific vulnerability to infection with knowledge of relevant pathogens and their antibiotic susceptibility	B
	Knowledge of antibiotic resistance and stewardship	B
	Knowledge of microbiome and risk stratification of infectious disease development	B
	Immunisation	H
	Family care and care of newborn baby	
	Knowledge of normal development, common minor problems and morphological variation and the importance of communication with other health care professionals and the parents	B
	Transport of the newborn baby	
	Competence of patient retrieval and transport of sick newborn infants	B
	Ethics	
	Competence in the basic ethics of newborn medicine	B

APPENDIX 1: REQUIREMENTS FOR INSTITUTIONS OFFERING NEONATOLOGY TRAINING

This section describes features that are desirable for an optimal setting for a training centre for specialist Neonatology. Due to the differences in care between European countries, this description comprises recommendations, not obligations.

The perinatal unit providing training

Size of the unit: At a Neonatology training institution the number of patients and their care must be of such a standard as to be able to meet the training requirements within the time set. The institution should provide care for a majority of the range of neonatal diseases and should ideally have a minimum of 40 admissions of very low birth weight infants (< 1500 g) per year. Specifically, the trainee will be expected to demonstrate experience of leading the resuscitation/stabilisation and primary care for at least 25 very low birth weight infants (less than 1500 g) including at least 10 extremely low birth weight infants (< 1000 g). These details should be included in the assessment framework alongside the formal details signed off by the trainer.

Obstetrics: A hospital offering training for neonatologists should be part of a perinatal centre: The institution, or one closely linked to it, should be equipped for prenatal diagnosis of fetal disorders, management, admission and delivery of pregnant women with maternal or fetal high risk disorders, facilities for receiving maternal and infant transfers, delivery and caesarean section room with facilities for resuscitation of the newborn infant.

Other specialities: Each unit providing training in Neonatology should have defined lines of communication and access to specialist advice within the institution or within an established inter-institutional network from the following: Neonatal surgery and anaesthesia, paediatric cardiology, paediatric respiratory medicine, radiology (including ultrasound), ophthalmology, laboratory services for clinical chemistry, microbiology, and haematology and transfusion medicine, child development centre (clinical genetics, paediatric neurology and neurophysiology), paediatric nephrology, audiology and other surgical specialists (ENT, orthopaedics, neurosurgery). There should be access to necropsy by a trained perinatal/ paediatric pathologist.

Staff in other departments: Within each training hospital the following staff supporting neonatal intensive care must have training and expertise in the care of sick newborn infants and their parents: Radiographers, pharmacists, physiotherapists, neurophysiology staff, and social workers.

Supporting staff: Each unit providing training in Neonatology should have trained supporting staff to minimise inappropriate work which otherwise would be undertaken by nursing and medical staff. Examples are administrative, secretarial and clerical staff, medical technicians, audit assistants, and housekeeping staff.

Neonatal nursing staff

All units providing training in Neonatology should have a senior nurse with neonatal experience and managerial responsibility, together with a designated nurse responsible for further education and in-service nurse training. A nurse should ideally not have responsibility for more than two infants receiving neonatal intensive care.

There are occasions when one nurse should be responsible for only one baby on neonatal intensive care; for example, during admission, exchange transfusion, peritoneal dialysis or transport; and when a baby is particularly unstable (for example with severe pulmonary hypertension) or when dying. The need for one-to-one nursing cannot be predicted so there should always be at least one nurse available on each shift to fulfil this role.

A nurse should ideally not have responsibility for more than two babies who are receiving special care. The nursing establishment for each training hospital should be sufficient to allow for leave, maternity leave, sickness, study leave, staff training, attendance at multi-disciplinary meetings and professional development, without compromising the principles above.

Neonatal medical staff

Career grade doctors (Consultants): There should be at least three trained and nationally accredited (if available) neonatologists on the staff of the hospital. Each unit should have one neonatologist who is designated as responsible for the direction and management of the unit. These responsibilities encompass the monitoring of clinical policies, practice and standards. This person would usually be an authoritative source of advice for managers on the care of newborn babies. There should be a 24-hour cover by neonatologists whose principal duties are to the neonatal intensive care unit.

Resident Doctors: We recommend two tiers of staff are resident in a hospital providing neonatal intensive care continuously over a 24-hour period. In any unit providing training in Neonatology there must be 24-hour resident cover by neonatal trainees or doctors who have completed at least two years of general professional training in paediatrics, which includes 6-month experience of neonatal intensive care. This doctor should be available for the intensive care unit at all times, and not be required to cover more than one hospital. In addition, there will be a tier of qualified doctors in training (or nurses with advanced specialist qualifications) who provide continuous bedside supervision.

Parents

Parents should be actively encouraged to take part in the care of their baby and be involved in decision making.

Breast feeding should be actively facilitated. There should be comfortable, discreet areas dedicated for expressing milk and for breast feeding. Electric breast milk pumps should be widely available for all mothers, and there should be a system for home-loan of equipment. Wherever possible, human milk banks should be available for parents to donate excess milk.

In addition, if available, there should be other facilities for parents such as bedrooms, a quiet room, a bathroom, facilities for making drinks, and a telephone.

Further support for parents should include the availability of a social worker, religious adviser, bereavement counsellor, breast-feeding support staff, psychological / psychiatric advice, language interpretation services and community support after discharge from hospital.

Transport Services

Maternal transport: The training hospital should make every possible effort to encourage prenatal

maternal transfer of high-risk pregnant women to the perinatal centre and to avoid the postnatal transfer of preterm or sick infants. Information documents for referring hospitals and pregnant women should be available, as well as prenatal transfer facilities for pregnant women.

Neonatal transport: Each training unit accepting neonatal referrals should have, or have access to, an appropriately staffed and equipped transport service. When a doctor or a nurse is absent from the unit whilst transporting a baby there must be satisfactory arrangements to cover their duties.

Equipment

Each unit providing training in Neonatology should have a policy prepared in consultation with the technical service centre and agreed with the hospital management. There should be a budget for the purchasing, maintenance, replacement and upgrading of equipment for neonatal care, which complies with national standards. Such a policy should also extend to appropriate record keeping for usage of equipment and quality assurance in keeping with good laboratory and clinical practice.

Each neonatal intensive care cot in a training unit should have available the following: Incubator or unit with radiant heating, mask and bag or T-piece, ventilator with humidifier, syringe/infusion pumps, monitors for respiration, heart rate, blood pressure, transcutaneous or intra-arterial oxygen tension, oxygen saturation, and ambient oxygen, inhaled nitric oxide and facilities for providing therapeutic hypothermia, and if available, also aEEG and NIRS cerebral oximeters. There must be access to equipment for resuscitation, point-of-care blood gas analysis (on the neonatal unit, by unit staff), phototherapy, transillumination by cold light, portable x-rays, ultrasound scanning, expression of breast milk, transport (including mechanical ventilation), and instant photographs. Access to a video-laryngoscope would be desirable.

There should be access to a 24-hour laboratory service with micro-technique orientated to neonatal service needs.

Quality assurance

Clinical protocols: Each training site for Neonatology should have agreed written protocols (standard operational procedures, SOPs) for medical and nursing staff, which also contain details of practical procedures as resuscitation and management of extremely preterm infants. These protocols should be regularly reviewed through discussion and audit.

Monitoring clinical practice: There should be monitoring systems for short- and longer-term morbidity among survivors with plans for regular review; including protocols for cerebral ultrasound examination, screening and treatment for retinopathy of prematurity, and screening of high-risk survivors for hearing loss. A minimum data set to form the basis of an annual report should comprise the following items, stratified by birth weight and gestational age: the number and duration of admissions should be classified according to international guidelines; the numbers of mothers and infants transferred to and from that maternity unit for care; mortality before 28 days and before discharge from hospital classified by cause; number of infants receiving ventilatory support and duration, post-mortem examination rate.

Assessment of training centres and trainers

The assessment for eligibility of trainers and training centres and ongoing quality assurance are regulated at national level in accordance with the UEMS-accredited European Neonatal Specialist Training Syllabus and the European Standards of Newborn Care.

APPENDIX 2: FUTURE DIRECTIONS / ENTRUSTABLE PROFESSIONAL ACTIVITIES (EPAs)

The ESPR has the stated ambition to continuously improve this syllabus and keep it at the cutting edge of medical practice and education. As the ETR Neonatology seeks to define minimum requirements for training in neonatal medicine, and, through these, foster the harmonisation of neonatal education in Europe, some of the most advanced concepts had to be deliberately left aside in order to maintain applicability across EU member states. Therefore, this section will provide a brief outlook of what to expect in the next revision of this document planned for the period 2024-2025, where some of the latest concepts will be included.

One of the cornerstones of the ETR Neonatology is its adherence to the principles of Competency-Based Medical Education (CBME). This is an outcome-based approach to the development, realisation and review of educational initiatives and the assessment of trainees using competencies. In other words, this approach focuses on the transfer into practice of competence profiles (knowledge, skills and attitudes), where the majority of teaching, learning and assessment should take place in a real-life, medical environment.

In the next revision of the ETR Neonatology, we envision the strengthening of the application of the CBME concept, and, in particular, the inclusion of advanced assessment instruments such as 'Entrustable Professional Activities (EPAs)'. The EPA framework does not take competences as a starting point, but rather a task or action from everyday medical practice. This allows the EPA system to assess not one, but several competences that make up a situation and is thus even closer to real-life scenarios.

In total, there are five 'types of supervision' according to the EPA concept. These stipulate the level of independence at which a trainee can carry out a given task. EPAs are tested by having different observers assess the trainee at different times in different situations. Please find below an overview of the EPA scaling:

- Level 1: Observed
- Level 2: Works under direct proactive supervision (supervisor in the room)
- Level 3: Works under indirect supervision (supervisor on call at all times)
- Level 4: Works without supervision (supervisor available but not on site)
- Level 5: Can supervise younger colleagues

As no EPAs have been defined for neonatal medicine at this stage, the ESPR will use the coming years to gather data through its educational initiatives. Based on this, we will prepare a succinct list of possible EPAs and group required competences according to these. This dataset will then provide the foundation for the next revision of the ETR Neonatology, so that it can be updated and restructured according to EPA principles.

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