EUROPEAN ASSOCIATION OF PERINATAL MEDICINE

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SUBSPECIALIST TRAINING PROGRAMME IN MATERNAL-FETAL MEDICINE

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Introduction

High-risk pregnancies and fetal diseases diagnosed during pregnancy have become common in tertiary care European hospitals, and they frequently require a multidisciplinary approach for the most successful management. There is recognised benefit in the supervision of these cases by a doctor with special training in maternal-fetal physiology and pathology, genetics, embryology, fetal and maternal diagnostic procedures, perinatal care and counseling. This constitutes the basis for the development of the subspeciality of Maternal-Fetal Medicine (MFM).

Educational objectives and requirements for training in this subspeciality are defined in this document and in the syllabus (Annex I). The role of a subspecialist in MFM is complementary to, and not in competition with, that of the specialist in Obstetrics and Gynecology. Due to its complex and constantly evolving nature, the practice of MFM should exclude the subspecialist from simultaneously training or practicing in another subspecialty, but not from practicing Obstetrics and Gynecology..

Training the subspecialist in Maternal-Fetal Medicine

1. Definition

The subspecialist in MFM is a specialist in Obstetrics and Gynecology, who is appropriately registered in a national medical council, and who has theoretical and practical training in:

a) Detailed risk assessment before, during, and after pregnancy.
b) Preconceptional and periconceptional counseling dedicated to detect risk factors, amenable to correction, which are related to an adverse pregnancy outcome.
c) Antenatal diagnosis of a wide range of fetal disorders, some of which may involve invasive fetal procedures as a form of diagnosis or treatment.
d) Management of high-risk pregnancies during the antenatal, intrapartum and postpartum period.

2. The aim of training

The main aim of training in MFM is to improve the care of women and fetuses at high-risk for adverse pregnancy outcome, in collaboration with other care providers. Subspecialists in MFM should be be capable of:

- Improving knowledge, practice, research and auditing in this area.
- Coordinating and promoting improvements in organization and provision of care.
- Providing leadership in development and research within the subspecialty.

3. The organization of training

3.1 The number of training centers and training posts is regulated by a relevant national body, which also has the power to withdraw recognition. The EAPM together with EBCOG are available to organize a training certification visit, if requested by the center or by the national authority.

3.2 The approval of a **training center** should be based on:

a) The development of a training program by an subspecialist MFM team within a Department of Obstetrics and Gynecology, in a hospital with multidisciplinary support from:

- A clinical genetics unit
- A neonatal intensive care unit team
- A pediatric surgical team
- An adult intensive care unit
- A perinatal pathologist
- An intervention radiology team

b) Production and quality indicators of the center, to guarantee sufficient exposure to MFM cases.

c) Existing internal procedures for quality control, organization of postgraduate training sessions, and scientific outputs.

3.3 The estimated **number of training posts** needs to reflect the exposure of Fellows to relevant cases, but also the national need for subspecialists in MFM, the available facilities and finances for training.

5. The means of training

5.1 The **entry requirements** for subspecialist training in MFM should be:

a) A recognized specialist qualification in Obstetrics and Gynecology or completion of a minimum of five years in an approved training program in Obstetrics and Gynecology.

b) The availability of a recognized national training program.

c) The availability of a recognized training post in an approved training center. An adequately **remunerated post** is a necessary condition. Arrangements for postgraduate training must be compatible with national employment and teaching legislation in relation to remuneration, hours of work, and rights of employees in such matters as sick leave, maternal and paternal leave and compulsory military service.

5.2 Each Fellow should be allocated a **tutor** to provide guidance and advice.

5.3 The main knowledge, clinical and research areas of MFM are listed in Appendix I:

5.4 Fellows should **participate in all usual MFM clinical activities** such as care of outpatients and inpatients, on-call duties during both day and night, ultrasound examinations and invasive procedures. Whilst achievement of competence in all MFM activities is the main goal of training, the following are considered as a **minimum experience** required to become a MFM subspecialist:

a) Autonomous conduction of **300 prenatal appointments in high-risk pregnancies**.

b) Autonomous or supervised conduction of **200 first trimester ultrasound examinations**.

c) Autonomous or supervised conduction of **200 second trimester ultrasound examinations**.

d) Autonomous conduction of **300 third trimester ultrasound examinations**.

e) Autonomous or supervised conduction of **30 fetal invasive procedures** (chorionic villus sampling, amniocentesis, cordocentesis).

f) Autonomous or supervised conduction of **15 cervical cerclages**.

g) Autonomous or supervised conduction of **15 external cephalic versions**.

h) Participation in the management of **15 complex cesarean deliveries** (placenta praevia, placenta accreta spectrum).

i) Autonomous supervision of **100 high-risk labor and deliveries**.

j) Autonomous conduction of **50 instrumental vaginal deliveries** (vacuum or forceps).

k) Autonomous or supervised conduction of **15 vaginal breech deliveries**.

l) Autonomous or supervised conduction of **15 vaginal twin deliveries**.

m) Participation in the management of **15 obstetric emergencies** (umbilical cord prolapse, shoulder dystocia solved with internal maneuvers, major postpartum hemorrhage, retained aftercoming head, maternal cardiorespiratory arrest, eclampsia)

5.5 Fellows should **participate** regularly in educational activities, including undergraduate and postgraduate teaching.

5.6 Fellows should **participate** regularly in clinic audit and research. The following **minimum experience** is required to become a MFM subspecialist:

a) Publication of **1 article** as first author or co-author in a Medline-indexed international scientific journal.

b) Presentation of **5 oral/invited communications** as first author or co-author in an international congress organized by an international scientific society.

5.7 The **duration** of subspecialty training is a **minimum of two years.**

5.8 The **structure of training** needs to have clear tasks and distribution of work, predefined targets to be met at specified intervals, and progress should be monitored by means of a logbook.

5.9 A fellow in MFM should be allowed to spend some of the training time in (an)other center(s).

6. Assessment of training

6.1 Regular progress of subspecialist training in MFM should be formally assessed by the tutor and MFM program lead, at intervals **not exceeding 6 months**. The main focus of these sessions should be obtaining feedback from the candidate and tutor, evaluation of the logbook, achievement of competencies, and programming the next stages of training.

6.3 Final assessment of the fellow and attribution of the title of subspecialist in MFM is the responsibility of the relevant national body, which can delegate this responsibility to the training center. It should take into consideration the following aspects:

a) Information provided by the fellow, tutor and MFM program lead.
b) Evaluation of the logbook.
c) Completion of the minimum objectives described in sections 5.4 and 5.6.

ANNEX 1

BASIC SCIENCES

1. Anatomy

Comprehensive knowledge of the fetus, placenta and maternal developmental anatomy relative to gestation age. Comprehensive knowledge of the histology of the genital tract, endocrine glands, placenta and the fetus.

2. Physiology

Comprehensive knowledge of maternal fetal, placental and neonatal physiology and physiopathology. Comprehensive knowledge of common physiological changes in fetal activities related to gestational age and pathological pregnancies. Comprehensive knowledge of maternal-fetal metabolism and placental transfer.

3. Genetics and molecular biology

Comprehensive knowledge of cell replication, molecular, genetic, and chromosomal basis of inherited disorders. Comprehensive knowledge of chromosome and of all defects causing fetal malformations. Comprehensive knowledge of molecular technologies linked to fetal DNA in maternal blood and the principles of epigenetics. Comprehensive knowledge and experience of the principles of genetic counseling.

4. Embryology and fetal development

Comprehensive knowledge of implantation, development of placenta membranes and amniotic fluid, organogenesis, the development of all body systems from embryonic through fetal to neonatal life. Comprehensive knowledge of common fetal malformations,

5. Pathology

Comprehensive knowledge of cell growth, differentiation and death, Comprehensive knowledge of the basic histologic features of common conditions in relations to obstetrics and neonatology.

6. Statistics and research

Comprehensive knowledge of statistics and its application to research in MFM. Comprehensive knowledge and experience on how to design, implement and interpret clinical research.

7. Microbiology and virology

Comprehensive knowledge of infective agents encountered in MFM, their mode of transmission, cellular and systemic effects.

8. Biochemistry

Comprehensive knowledge of the metabolism of carbohydrates, lipids, proteins and nucleic acids, of the role of the vitamins, minerals, and enzymes and of the composition and regulation of intracellular and extracellular fluids.

9. Biophysics

Comprehensive knowledge of the physical principles and biological effects on the reproductive organs and fetus of heat, sound and electromagnetic radiation. Comprehensive knowledge of the principles of laser, isotopes, X-rays, ultrasound and magnetic resonance imaging.

10. Immunology

Comprehensive knowledge of immune mechanisms and of the principles of reproductive immunology.

11. Pharmacology

Comprehensive knowledge of the properties, pharmacodynamics, actions, interactions, and hazards of pharmacological agents which are regularly used in obstetrics, particularly of the principles of teratogenicity and the implications of drug prescription during pregnancy, labor and lactation.

CLINICAL SCIENCES

1. Epidemiology and statistics

Comprehensive knowledge and experience in the collection and interpretation of observational data, such as those from national or regional databases. Comprehensive knowledge and experience in the application of epidemiology and statistics to clinical problems in MFM. Comprehensive knowledge of maternal and perinatal mortality and morbidity, and their main causes.

2. Clinical quality control

Comprehensive knowledge and experience on the application of evidence-based medicine, health economics and quality control to the provision of clinical care.

3. Population genetics

Comprehensive knowledge of population genetics.

4. Congenital abnormalities

Comprehensive knowledge of the major congenital anomalies and clinical experience in applying screening, diagnosis, patient counseling, and subsequent management of these cases.

5. Endocrinology

Comprehensive knowledge of maternal-fetal endocrinology and clinical experience in management of the most frequent disorders in this area.

6. Assisted reproduction technologies

Knowledge of assisted reproductive technologies and their impact on pregnancy course and outcomes.

7. Environment and climate influences on reproduction and pregnancy

Comprehensive knowledge of the effects of environmental pollutants and climate changes on human reproduction and their impact on pregnancy course and outcomes.

8. Nutrition

Comprehensive knowledge of the principles of nutrition and diet, macro- and micro- nutrients important for the periconceptional, pregnancy and postpartum periods. Clinical experience in basic nutritional counseling.

9. Non-communicable diseases (NCDs)

Comprehensive knowledge of the relation between NCDs, pregnancy and the developmental origin of adult disease. Clinical experience in patient counseling and management of NCDs during pregnancy .

10. Periconceptional counseling

Comprehensive knowledge of risk factors amenable to prevention in the periconceptional period which impact on pregnancy course and related outcome, as well as clinical experience in patient counseling.

11. Infectious diseases

Comprehensive knowledge of the epidemiology, etiology, pathology, maternal, fetal and neonatal complications, as well as clinical experience in prevention, counseling and management of the most frequent infectious diseases occurring during pregnancy.

12. Obstetric ultrasound

Comprehensive knowledge of the principles and a high level of clinical experience in ultrasound imaging and Doppler in pregnancy and the postpartum period.

13. Cardiotocography

Comprehensive knowledge of the principles and a high level of clinical experience in acquisition, interpretation and subsequent management of cardiotocographic tracings in pregnancy and the intrapartum period.

18. Complex obstetric procedures

Comprehensive knowledge of the principles and a high level of clinical experience in complex obstetric procedures such as cervical cerclage, external cephalic version, instrumental vaginal delivery, breech delivery, and twin delivery. Comprehensive knowledge of the principles and a high level of clinical experience complex cesarean deliveries (placenta praevia, placenta accreta spectrum).

19. Management of obstetric emergencies

Comprehensive knowledge of the principles and a high level of clinical experience in management of obstetric emergencies (umbilical cord prolapse, shoulder dystocia solved with internal maneuvers, major postpartum hemorrhage, retained aftercoming head, maternal cardiorespiratory arrest, eclampsia).

20. Complex obstetric procedures

Knowledge of the principles of fetal autopsy and fetal/placental histopathologic. High level of experience in interpretation of these results and patient counseling regarding them.

21. High-risk labor and delivery

Comprehensive knowledge of the principles and a high level of clinical experience in management of high-risk labor and delivery, instrumental vaginal delivery, cesarean delivery, and the prevention of obstetric emergencies.

22. Communication and teamwork skills

Comprehensive knowledge of the principles of oral and written communication with patients and other healthcare professionals, and a high level of experience in this field**.** Knowledge of the principles and clinical experience in bereavement support.

23. Ethics and the laws

Comprehensive knowledge of the ethical and legal issues related to MFM at a national and European level.

24. Neonatal care

Knowledge of the major principles of basic neonatal care and neonatal intensive unit care. Basic experience in neonatal resuscitation.

25. Risk management

Comprehensive knowledge of the principles and practical experience in application of risk management to MFM.

25. Clinical governance

Comprehensive knowledge of the principles and practical experience in application of clinical governance to MFM.