UEMS - OB/GYN SECTION

EUROPEAN BOARD AND COLLEGE OF OBSTETRICIANS AND GYNAECOLOGISTS (EBCOG)

AND

EUROPEAN SOCIETY OF HUMAN REPRODUCTION AND EMBRYOLOGY (ESHRE)

SUBSPECIALIST TRAINING PROGRAMME IN REPRODUCTIVE MEDICINE

POSTGRADUATE TRAINING AND ASSESSMENT WORKING PARTY

Prepared: *Paris, Friday 18 September, 1998*

Chairman: J. Lansac (France)

Members: J.J. Amy (Belgium), R. Beard (UK), W. Dunlop (UK), P. Devroey (Belgium-ESHRE), B.C. Tarlatzis (Greece -ESHRE) A. Van Assche (Belgium), V. Unzeitig (Czech Rep.)

Apologies for absence: F. Nunes (Portugal, ENTOG); G. Schlaeder (France), K.Schneider (Germany)

Modified: *Brussels, Friday 13 February, 2004*

ESHRE: B.C. Tarlatzis (Greece), J. Evers (The Netherlands), P. Devroey (Brussels), A. Sunde (Norway)

In Europe approximately 14% of the couples have difficulties to conceive. The treatment demand is increasing probably because the couples are actually trying later to conceive and fertility decreases with the age of the partners. The management of infertile couples and the development

of assisted reproductive techniques (ART) need multidisciplinary approach and require special training, such as in endocrinology, andrology, reproductive surgery, reproductive biology, genetics, psychology of both partners.

EBCOG noted with approval the development of subspecialty practice in a number of countries and considered that reproductive medicine should be recognized as a subspecialty in Europe.

Educational objectives and requirements for training in these subspecialist areas have been defined with acknowledged experts from the European Society of Human Reproduction and Embryology (ESHRE) and are recognized in the syllabus (Annex I). The role of a subspecialist is complementary and not competitive to the specialist in Obstetrics and Gynecology.

1. Definition of the Reproductive Medicine Subspecialist

1-1 Definition

The Reproductive Medicine subspecialist is a specialist in Obstetrics and Gynecology who has had theoretical and practical training in:

a) medical and surgical management of infertility . This may involve treatment of the male if practiced by the gynecologists in the country. It will involve a range of assisted reproductive techniques (ART)
b) reproductive endocrinology

Comprehensive management of these problems includes diagnostic, therapeutic procedures and audit of outcome.

Subspecialists, after completion of their training, continue to devote at least half, and probably more, of their working time to the field of Reproductive Medicine.

1-2 Aim

Aim of the training is to improve the care of patients with disorders of reproductive function in collaboration with other care providers .

.

1-3 Objectives of training:

To train a subspecialist to be capable of:

- improving knowledge, practice, teaching, research and audit;
- co-ordinating and promoting collaboration in organizing the service;
- providing leadership in the development and in research within the subspecialty.

1-4 Organisation

- the number of training posts should be strictly regulated by the relevant national body in order to provide sufficient expertise.
- training program should be in a multidisciplinary center and should be organized by a subspecialist or an accredited subspecialist .[1]
- center should use guidelines and protocols finalized by national professional bodies reviewed at regular intervals .
- training as a subspecialist in reproductive medicine does not imply an exclusive activity in that field .

2. Means

2.1 Entry requirements:

• a recognized specialist qualification in Obstetrics & Gynaecology or have completed a minimum of five years in an approved training program in OB/GYN.
• the availability of a recognized training post .

2.2 An adequately remunerated post in a recognized training program is a basic condition. Each Fellow must have an appointed tutor for guidance and advice.

2.3 For each country, the number of training posts should reflect the national need for sub-specialists in reproductive medicine as well as the facilities and finance available for training.

2.4 Training should be directed towards achieving competence. Fellows should participate in all hospital activities, such as the care of out-patients and in-patients, on call duties, performing endoscopic surgery, assisted reproductive techniques such as ovulation induction, insemination, IVF and participating in educational activities, including the teaching of other health professionals. Participation in audit and clinical or basic research is essential.

2.5 Arrangements for postgraduate training must be compatible with national employment legislation in relation to remuneration, hours of work and rights of employees in such matters as sick leave, maternity and paternity leave and compulsory military service.

2.6 Duration of training
Duration of subspeciality training should include **a minimum of two years** in an approved program and should cover the clinical and research aspects of the following areas :

[1] Initially there will be a transitional period when accreditation for training will be given by the national appointing authority to a Specialist in Obstetrics and Gynaecology with proven scientific and clinical expertise in reproductive medicine . Subsequently only individuals with training in the subspecialty should hold such a position.

- Reproductive surgery
- Endocrinology
- Andrology
- Ultrasound imaging
- Reproductive biology
- Genetics
- Counselling

2.7 Training should be structured throughout with clearly defined targets to be met after specified intervals. An educational plan should be drawn up in consultation with the Fellow at the beginning of each attachment and progress should be monitored regularly by mean of the log book.

2.8 A Fellow may spend some training time in another (1 or 2) center(s) recognized by EBCOG after approval by the national committee.

3. Assessment of training

3.1 In all European countries approval of training and trainers should be the responsibility of a national or regional authority which has the power to withdraw recognition if necessary.

3.2 Approval of institutions as training centers should be based on the following general and special requirements, provided they do not conflict with national laws.

General Requirements for Subspecialty Training Centers

To be eligible for subspecialty training a center must:

i. provide a service for the referral and transfer of patients who would benefit from subspecialty facilities, expertise and experience;
ii. have established close collaboration with related disciplines to provide the high degree of teamwork and concentration of resources for the intensive investigation and management of such patients;
iii. have established close collaboration with other obstetricians and gynaecologists and related specialists within and outwith the center, including major regional roles in continuing postgraduate education and training, research advice and co-ordination, and audit;
iv. have an adequate workload providing a full range of experience in the subspecialty; alternatively two or more centers may combine to provide a programme with all the required experience;
v. have a programme director who will co-ordinate the training programme, accept the main responsibility for its supervision and be actively involved in it; when more than one center provides the programme, there must be a supervisor at each center, with one having overall responsibility as director. Directors and supervisors will be consultants with special experience

in the relevant subspecialty field, and with the eventual development of subspecialisation the directors and supervisors will themselves be trained subspecialists. If the programme director changes the programme the training center will be revisited;

vi. have adequate medical staffing to enable the Fellow to be engaged in his/her subspecialty field on a full-time basis (or in the case of a part-time Fellow, during all of his/her normal working hours); participation in emergency and on-call work outside normal working hours is not excluded, subject to approval by the Subspecialty Committee;

vii. have adequate library, laboratory and other resources to support subspecialty work, training and research;

viii. provide the resources for a research programme related to the subspecialty.

Specific Requirements for Training Centers in Reproductive Medicine

To be eligible for subspecialty training in reproductive medicine a center must:

i. provide a service for the referral and transfer of patients with endocrine and infertility problems requiring special diagnostic and therapeutic facilities and expertise, with close collaboration with other gynaecologists within and outwith the centre;

ii. have an adequate clinical workload with a full range of gynaecological endocrine, fertility and infertility (female and male) problems;

iii. have appropriate clinical facilities for investigating the relevant endocrine and infertility disorders;

iv. have access to appropriate endocrine and ultrasound investigations for monitoring women having ovulation inductions;

v. have an established assisted conception programme, including assisted fertilisation with appropriate clinical and laboratory facilities;

vi. provide training in laparoscopic and hysteroscopic surgery for investigation and treatment including ovarian biopsy and cystectomy, oophorectomy, treatment of ectopic pregnancy, adhesiolysis, salpingolysis, treatment of endometriosis, endometrial biopsy, removal of endometrial polyps, endometrial resection/ablation, hysteroscopic resection of fibroids;

vii. participate actively in the investigation of male infertility and collaborate closely with consultant urologists/andrologists and their staff with commitments to the investigation and management of male infertility;

viii. have an established donor gamete programme or facilitate Fellows-in-training to familiarize themselves with gamete donation;

ix. collaborate with consultant physicians/endocrinologists and their supporting staff having definite commitments to the care of endocrine disorders in women during the reproductive years of life;

x. have an adequate gynaecological pathology service;

xi. have a research programme in the subspecialty field with access for the Fellow to support his or her own training programme.

3.3 Assessment of the Fellow should be carried out by a national or federal committee of experts and would take into consideration:

-Participation in reproductive medicine courses in particular those recognized by EBCOG advised by ESHRE.

-Completion of the log book of clinical experience in Reproductive Medicine.

-Peer review publications in a nationally recognized journals.

3.4 A representative from the EBCOG post-graduate training and assessment working party may be an observer on the national or federal assessment committee.

3.5 EBCOG in conjunction with ESHRE is willing to organize an evaluation visit to a sub-specialist unit if requested.

4. Training Programme

The following advanced knowledge and skills should be acquired:

a) an advanced understanding of:
   i) endocrine physiology, pharmacology of substances that regulate the reproductive systems and the relevant aspects of the thyroid and adrenal systems;
   ii) the endocrine dynamics of pregnancy and the menstrual cycle;
   iii) the physiology of conception and reproductive tracts related to fertility and reproduction, aspects of basic and applied embryology and the techniques of in vitro fertilization, including assisted fertilization and assessment of sperm function;
   iv) immunology and genetics related to reproduction;
   v) psychosomatic aspects of reproductive endocrinology;

b) basic knowledge of:
   i) clinical pharmacology of hormones;
   ii) gross and microscopic pathology relating to reproductive medicine;

c) the capacity to interpret, perform and/or supervise endocrine laboratory diagnostic procedures with the relevant statistical methodology. This should include a module of laboratory training with the personal involvement in an established assay and an understanding of how a new assay is established and validated;

d) clinical competence in the management of endocrine and fertility problems including:
   i) diagnosis of pituitary, central nervous system, thyroid and adrenal diseases relating to reproduction;
   ii) diagnosis and management of ovarian diseases related to reproduction;
   iii) biological and chemical assessment of endocrine function related to reproduction, including experience in the performance and supervision of appropriate endocrine studies;

iv) management of endocrine deficiency states including spontaneous and induced menopause;
v) expertise in assisted conception, including ovarian stimulation and the management of hyperstimulation syndrome, sperm and ovum retrieval techniques and management of their complications;
vi) expertise in endoscopic techniques related to the diagnosis and treatment of reproductive problems; including laparoscopic and medical management of ectopic pregnancy;
vii) experience in open and minimal access surgery designed to correct reproductive and particularly infertility problems; this would include an understanding of the role of tubal microsurgery;
viii) fertility control and family planning;
ix) expertise in ultrasound of the uterus and ovary in order to perform follicle tracking and diagnosis of early pregnancy and its problems;
x) early pregnancy problems; clinical competence and detailed understanding of the differences in etiology and management of:

- sporadic miscarriages and their complication
- recurrent miscarriage, diagnostic criteria, management and counseling
- ectopic pregnancy

e) experience and knowledge of:
i) administration and management
ii) teaching
iii) legal and ethical issues
iv) epidemiology, statistics, research and audit

Annex I :

Guides to learning

1. Clinical Pharmacology of Hormones

Objectives:
The Fellow should understand and be able to discuss:

1. absorption, excretion, distribution and biotransformation of drugs and hormones, showing knowledge of these mechanisms for transfer across membranes (e.g., placenta) and into breast milk, storage, metabolism, enzyme systems, renal, hepatic and fecal excretion;
2. discuss general mechanisms of drug and hormone action including structure-activity relationships, receptors and sites of action;
3. characterize drug and hormone effects, including dose-responses, biological variations, spectrum of effects and factors that modify effects (e.g., age, sex, body weight, route of administration, tolerance and drug or hormonal interactions), agonist and antagonist;

4. relate drug toxicity and hormone reaction to allergy, teratogenicity, dependence and addiction;
5. indicate governmental and pharmaceutical regulations pertaining to drugs and hormones and their developments;
6. understand the design, analysis, and organization of participation in clinical trials.
7. understand the toxicity of drugs commonly used for ovulation induction, treatment of endometriosis, hormone replacement therapy, and assisted reproduction.

2. Pathology

Objectives:

The Fellow should understand and be able to discuss:

1 Vagina and cervix

1. the gross and microscopic findings of endometriosis and adenosis;
2. the possible consequences of antenatal hormone exposure;
3. the effects of various hormones on the vagina and cervix;
4. endometrium;
5. histological appearance of normal and abnormal endometrium;
6. the current data relating estrogen with endometrial hyperplasia and adenocarcinoma;
7. acute and chronic endometriosis;
8. developmental stages of the endometrium (dating);
9. implantation, the placenta and uterus in early pregnancy;

3 Myometrium:

1. the gross and microscopic findings of adenomyosis, leiomyoma and other myometrial lesions related to reproduction;
2. the relationships of leiomyomas to infertility including each of the different types (e.g. subserosal, intramural and submucosal);

.

4 Oviduct:

1. the gross and microscopic findings of diseases of the oviduct related to reproductive endocrinology (e.g. acute and chronic salpingitis, granulomatous salpingitis, endometriosis);
2. the natural history and clinical course of acute and chronic salpingitis and relate these to subsequent fertility;

5 Ovary:

1. the gross and microscopic findings and describe the natural history of ovarian tumours related to reproductive function (e.g. follicular cysts, luteoma, corpus luteum, polycystic ovarian syndrome, endometrioma, granulosa-theca cell tumour, Sertoli-Leydig cell tumour, gynandroblastoma, cystic teratoma, dysgerminoma, gonadoblastoma and mixed germ cell or gonadal tumours);
2. the different compartments of the Graafian follicle (e.g. granulosa cells, theca and adjacent stroma) and the primordial, preantral, antral and Graafian follicles, including the dynamic changes which occur in the ovary from embryo to menopause;
3. specific staining techniques and cellular ultrastructure as related to function;
4. the gross and microscopic findings and the development of gonadal structures found in various forms of gonadal dysgenesis and intersex conditions;

6 Hypothalamus-CNS:

Organic and functional disturbance of the hypothalamus and CNS on endocrine and reproductive function.

7 Pituitary:

1. cellular morphology of normal and neoplastic cells of the adenohypophosis;
2. the effect of organic and functional disturbance of the pituitary on endocrine and reproductive function.

8 Testis:

1. the various stages of normal and abnormal spermatogenesis;
2. the gross and microscopic findings in testicular disease (e.g. teratoma, seminoma, leydig and sertoli cell tumours).

9 Thyroid/adrenal:

1. the normal thyroid structures and the various thyroid lesions associated with altered reproductive endocrine function (e.g. Graves disease, thyroiditis, neoplasia);
2. the normal adrenal structures and the various adrenal lesions associated with altered reproductive endocrine functions (e.g., hyperplasia, adenoma, carcinoma, phaeochromocytoma).

3. Immunology

Objectives:
The Fellow should understand and be able to discuss:

1. the essentials of basic immunology;
2. the usefulness and limitations of immunological tests in infertility;
3. the pathophysiology of autoimmune disease to gonadal failure and other primary endocrine dysfunction, including the autoimmune aspects of gonadal dysgenesis;
4. the developing knowledge of immunology to contraception, including vaccination against conception;
5. the effect of active and passive immunization upon changes in hormone-specific target tissues;
6. the clinical features and interactions of autoimmune endocrinological disease (e.g. of thyroid, adrenal, gonad);
7. the immunological mechanisms proposed to underlie successful and unsuccessful implantation;

4. Embryology

Objectives:
The Fellow should understand and be able to discuss:

1. the embryonic development of the genital tract including the factors controlling male and female development of the gonadal primordia, internal duct system and external genitalia;
2. how patients with developmental abnormalities of the genital tract including ambiguous genitalia, imperforate hymen and vaginal septa, uterine anomalies, Mullerian agenesis and gonadal dysgenesis should be diagnosed and managed;
3. the embryology of the hypothalamic-pituitary and other pertinent endocrine systems;
4. the embryology of the urological system;
5. the various stages of oocyte and sperm maturation and of fertilization;
6. the pre-implantation development of the human embryo in vitro and in vivo.

5. Genetics

Objectives:
The Fellow should understand and be able to discuss:

1. normal genetics (e.g. Mendelian inheritance, the structure and identification of chromosomes and gametogenesis);
2. abnormal genetics including chromosome abnormalities and genetically transmitted. abnormalities of sexual development (e.g, hermaphroditism, Turner's syndrome);

3. inherited, non-reproductive disorders referrable to reproduction (e.g., congenital adrenal hyperplasia, diabetes mellitus);
4. genetic studies including pedigree, karyotype analysis, antenatal diagnosis of genetic disease, including use of gene probes and associated techniques; indications and arrangements for specialized genetic diagnosis and counseling;
5. inherited causes of infertility and early pregnancy loss;
6. genetic aspects of artificial insemination and assisted fertilization;
7. techniques, methods and implications of preimplantation genetic diagnosis.

6. Anatomy, Physiology and Pathophysiology

1. Neuroendocrine Function CNS-Hypothalamic-Pituitary System and Disease States

Objectives:
The Fellow should understand and be able to discuss:

1. anatomical-functional aspects of the hypothalamus, neurovascular relationships, hypothalamo-hypophseal portal circulation and target cells of the pituitary;
2. suprahypothalamic structures and neuronal systems relevant to regulation of reproductive processes;
3. the site of production, biological action and control of secretion of oxytocin, vasopressins and neurophysins;
4. biochemical basis of neuroendocrine action of neuropharmacology of agonists and antagonists;
5. the pineal gland: the blood brain barrier;
6. sex steroid concentrating neurones;
7. distribution and cellular characteristics of pituitary hormone producing cells with special reference to gonadotrophe and lactotrophe;
8. anatomical and functional aspects of the peptidergic and catecholaminergic system and their control of the pituitary hormone secretion;
9. structure and function of pituitary reproductive hormones and neuropeptides;
10. control of secretory activities of the pituitary hormones, including long and short- term rhythms, and their target organs and feedback systems;
11. neuroendocrine regulation of the menstrual cycle;
12. neuroendocrine function of the fetus and placenta;
13. hypothalamic and pituitary hypopituitarism and disorders of oversecretion of pituitary hormones;
14. organic lesions and/or functional disorders of the hypothalamic-pituitary system;
15. ectopic hormone syndromes.

2. Ovarian Function and Disease States

Objective:
The Fellow should understand and be able to discuss:

1. cyclic changes in endocrine activities within the ovary;
2. synthesis and secretion of hormone substances by the various compartments and cell types of the ovary. Intra- and extra-ovarian control mechanisms;
3. mechanism of protein/steroid hormone action in the ovary;
4. regulation of hormone receptors;
5. atresia and selection of the dominant follicle;
6. luteolysis;
7. hormone producing tumors of the ovary;
8. ovarian activity during gestation;
9. age-related changes in ovarian structure and function;
10. clinical and pathophysiological correlates of disorders of the human ovary (structure and function).

3. Thyroid Function and Disease States

Objectives:
The Fellow should understand and be able to discuss:

1. TRH-TSH-thyroid physiology;
2. the diagnostic value of TSH, thyroid hormones total and free, thyroid stimulating immunoglobulins and related diagnostic tests;
3. the biosynthesis, control and metabolism of thyroid hormones;
4. the clinical and pathophysiological correlates of hypo- and hyperthyroidism, particularly as related to menstrual disorders and fertility;
5. pregnancy and hormone induced changes of thyroid function in the mother and the effect of abnormal maternal thyroid function on the fetus;
6. thyroid physiology in the newborn. Identification of cases at high risk of neonatal thyrotoxicosis;
7. the effects of thyroid replacement and anti-thyroid drug therapy on the fetus;
8. pathophysiology of thyroiditis;
9. thyroid function in stroma ovary, molar pregnancy and choriocarcinoma;
10. medical and surgical management of non-toxic goitre, hypo- and hyperthyroidism.

4. Adrenal Function and Disease States

Objectives:
The Fellow should understand and be able to discuss:

1. regulation and secretion of adrenocortical hormones;
2. clinical and laboratory assessment of adrenocortical function;

3. pharmacology of naturally occurring and synthetic glucocorticoids and mineralocorticoid;
4. adrenocortical hypo- and hyperactivity (e.g., Cushing's hyperplasia, adenoma, carcinoma);
5. congenital adrenal hyperplasia (see Genetics);
6. effects of aberrations of adrenocortical function on hypothalamo-pituitary- ovarian function, including Nelson's Syndrome;
7. aldosterone and disorders of the renin-angiotensin system;
8. catecholamine disorders.

5. Androgen Disorders

Objectives:
The Fellow should understand and be able to discuss:

1. production, physiology and metabolism of androgens in normal women and describe the mechanisms of action of androgens;
2. the symptoms and signs of androgen excess together with any causes based on pathophysiology of androgen excess;
3. the physiology of normal and abnormal hair growth;
4. ovarian tumors, benign and malignant, which secrete androgens;
5. those benign stromal changes in the ovary which may result in increased androgen production;
6. relate polycystic ovarian syndrome to abnormal hormone production;
7. androgen resistant states;
8. congenital and acquired adrenal hyperplasia in terms of etiology, genital morphology, general metabolic effects and differentiate action and treatment;
9. the management of androgen excess and of hirsutism and undertake such management;
10. the pharmacology of anti-androgens;
11. androgen production and its control in the testis.

6. Disorders of Menstruation

Objectives:
The Fellow should understand and be able to discuss:

1. endocrine criteria of the normal menstrual cycle. Understand the effects of sex steroids on the endometrium;
2. the effects of steroids in relation to proliferation of the endometrium, secretory changes, and menstruation, including spiral arteriolar change, lysosome stability and fibrinolysis;
3. the pathophysiology of disorders of menstruation;
4. anovulation and the resultant hormonal changes indicating any effect on the endometrium, including endometrial hyperplasia;

5. Assessment including methods of quantitating menstrual blood loss and undertake the medical and surgical treatment of patients with abnormal menstrual bleeding;
6. management of non-gynecological causes of abnormal bleeding (e.g., hypothyroidism, blood dyscrasias and anti-coagulants).

7. Amenorrhea and the Menopause

Objectives:
The Fellow should understand and be able to discuss:

1. the pathophysiology of amenorrhea, including nutritional and psychological aspects;
2. structural abnormalities of the genital tract associated with amenorrhea;
3. discuss amenorrhea in relation to puberty and menarche;
4. the clinical manifestations of conditions associated with amenorrhea (e.g., polycystic ovarian syndrome, hypopituitarism, gonadal dysgenesis);
5. the physiology and pathophysiology of prolactin secretion. The management of patients with inappropriate prolactin secretion;
6. the techniques for the evaluation and therapy of patients who require ovulation induction;
7. the interpretation of tests used to evaluate amenorrhea;
8. a rational diagnostic and therapeutic approach to patients with amenorrhea;
9. the treatment options for young women with ovarian failure, with particular regard to future fertility;
10. the advantages and disadvantages, risks and benefits of hormone replacement therapy.

8. Puberty

Objectives:
The Fellow should understand and be able to discuss:

1. the normal sequence of pubertal changes in the female and male and their chronology;
2. the effects of hormones on bone growth and epiphyseal closure;
3. the hormonal changes and gametogenesis relative to the reproductive cycle from intrauterine life to the development of normal reproductive cycles (e.g., gonadotrophin secretion in the fetus and the neonate; sensitivity of the feedback system during fetal and neonatal life and childhood; the role of adrenal androgens);
4. delayed puberty indicating the differential diagnosis evaluation and appropriate therapy;
5. sexual precocity indicating the differential diagnosis, evaluation and appropriate therapy.

9. Infertility - Female

Objectives:
The Fellow should be able to :

1. take an appropriate history and examine the woman;
2. evaluate, describe, diagnosis and plan therapy for:

1. ovulatory disorders: including use of basal body temperature, plasma progesterone and endometrial biopsy; diagnosis of causes of anovulation: syndromes of inappropriate prolactin secretion, CNS-hypothalamic-pituitary syndromes and other causes; selection of ovulation induction utilising anti-estrogens, gonadotrophins, dopamine agonists, GnRH, GnRH analogues and other agents;
2. tubal disorders: including correct use of and interpretation of studies of tubal function (e.g., ultrasound, hysterosalpingography and laparoscopy); indications for tubal reparative procedures including micro-surgery and/or laparoscopic surgery, versus assisted conception;
3. endometriosis and other peritoneal disorders: including diagnosis and staging of endometriosis and other peritoneal causes of infertility; knowledge of the medical management of endometriosis;
4. cervical factors: including tests for sperm/cervical mucus interaction and possible therapy;
5. artificial insemination including the indications and contra-indications; selection of donors and sperm banking;
6. ovum donation: indications, recruitment, counselling and methods for preparation of donors and recipients;
7. adoption: including the indications for adoption; knowledge of appropriate counselling methods; familiarity with various local agencies and legal implications dealing with adoption.
8. surrogacy: indications, knowledge of appropriate counselling methods;

10. Infertility – Male

Objectives:

1. The Fellow should be able to take an appropriate history and examine the man, including detailed genital examination and arrange/perform appropriate investigations and treatment.
2. The Fellow should understand and be able to discuss:

    1. the formation and content as well as examination of the seminal fluid;
    2. the cycle of spermatogenesis, including endocrinological control mechanisms, its abnormalities and the effects of drugs;
    3. the physiology and pathophysiology of sexual function;
    4. causes of azoospermia and aspermia;
    5. the biosynthesis of estrogens, androgens and progestogens by the human testis and the biological action of testosterone in man;
    6. investigation, diagnosis and therapy of infection of the male reproductive system;
    7. cryobiology of semen, counselling of donors and recipients of donor insemination, sperm banking;
    8. in vitro and laboratory tests of sperm function, e.g., mucus penetration, zona free hamster egg penetration, biochemistry etc;

9. the value and limitations of testicular biopsy and endocrine assessment such as plasma FSH;
10. vasography;
11. the physiology of endocrine and gametogenic function of the testes and accessory glands.
12. indications and methods of assisted fertilisation, including intracytoplasmic sperm injection;
13. methods of surgical sperm retrieval.

11. Psychosexual Aspects of Reproductive Medicine

Objectives:
The Fellow should understand and be able to discuss:-

1. the psychodynamics of growth and development, puberty and the establishment of the gender role;
2. antenatal hormone influence on subsequent behaviour and psychological function;
3. psychological factors in amenorrhea;
4. the psychological changes associated with treatment of infertility;
5. the psychological changes associated with hormonal therapy;
6. the psychological and endocrine factors associated with the premenstrual syndrome;
7. the psychological and endocrine factors associated with the menopause;
8. the effects of infertility upon the family;
9. the general concepts of normal and abnormal sexual function and gender and awareness of local facilities for counselling.

12. Endocrinology of Pregnancy

Objectives:
The Fellow should understand and be able to discuss:-

1. the feto-placental unit as relates to the physiology and pathophysiology of steroid hormones (e.g., estrogen, progestogen, corticosteroids);
2. the physiology of decidua-chorionic-placental peptide hormones (e.g, gonadotrophins, somatomammotrophin, thyrotrophin, ACTH/opioid peptides and prolactin);
3. the initiation of parturition including physiology, pathophysiology and pharmacology of prostaglandins;
4. the physiology of fetal adrenal gland;
5. the endocrine pathophysiology of preeclampsia and eclampsia including the possible roles of renin, angiotensin, aldosterone, nitric oxide and prostaglandins (refer to fetal medicine);
6. the physiology and pathophysiology of fetal hypothalamic-pituitary-gonadal function and pancreatic function;

7. the pathophysiology of altered maternal thyroid, adrenal and pancreatic status during pregnancy.
8. endocrine mechanisms contributing to the successful and unsuccessful implantation.

7. Clinical Diagnostic Techniques and Imaging

Objectives:
The Fellow should:

1. be competent in operative procedures: including biopsies of the vagina, cervix and endometrium, cytological studies; endoscopy with dye instillation and endoscopic biopsy; laparotomy, with biopsy; diagnostic laparoscopy, hysteroscopy and other intra-abdominal diagnostic techniques;
2. understand and be able to interpret: hysterosalpingography; sella turcica imaging by MRI; arteriography; computerised tomography; arterial catheterisation, digital subtraction angiography, venous catheterisation; intravenous and retrograde urography and isotope imaging methods;
3. understand the endocrinological measurement of hormonal substances in biological fluids for evaluation of the various endocrine systems including the hypothalamus, pituitary, parathyroid, thyroid, adrenal, gonadal systems and pregnancy and also be able to perform and interpret dynamic endocrinological testing of these systems;
4. other techniques: be able to perform field examination; appropriately utilise and interpret chromosomal studies and karyotyping;
5. ultrasound skills: The Fellow should be competent in:
    - appearance of normal and abnormal uterus including fibroids. Endometrial assessment including normal cyclical changes, changes associated with hormone replacement, hyperplasia and malignancy;
    - assessment of ovarian, parovarian and tubal masses;
    - tracking of folliculogenesis and formation and disappearance of corpus luteum;
    - use of ultrasound for assessment of tubal patency using contrast media;
    - confirmation of intrauterine gestational sac with embryo, yolk sac, cardiac pulsation;
    - diagnosis of ectopic pregnancy;
    - assessment of gestational age;
    - assessment of cervical length and dilation.
6. understand the risks and limitations of procedures; diagnosis and evaluation of diagnostic procedures;
7. understanding the validity of diagnostic tests, variability and reliability criteria;
8. understand the need for clinical record keeping and data storage including use of photography;
9. The Fellow should have seen in clinical practice and understand the implications of the results for management and be able to discuss:
    - nuclear magnetic resonance;
    - bone densitometry.

8. Surgical Techniques

Objectives:
The Fellow should be competent of independent practice in:

1. fertility control: including laparoscopy and laparotomy techniques; reversal of sterilisation;
2. diagnostic techniques: including hysterosalpingography and endoscopy (see clinical diagnostic techniques and imaging);
3. infertility surgery: including
   (a) uterus - septate uterus, myomectomy, lysis of uterine synechiae;
   (b) fallopian tube - reparative techniques for tubal and/or adhesive pelvic disease;
   (c) ovaries - cystectomy and reconstruction; ovarian diathermy/laser drilling
   (d) endometriosis - staging, surgical therapy;
4. the role of endoscopic surgery in the treatment of the above conditions;
5. management of imperforate hymen and vaginal septa;
6. complications: including the incidence and the preventive and other therapeutic measures for immediate and late complications of reproductive and infertility surgery.

The Fellow should understand:

1. developmental disorders: incuding those of:
   a. vagina - vaginal reconstruction by dilatation or surgery
   b. uterus - knowledge of Mullerian anomalies with obstruction of drainage;
2. Ambiguous genitalia: including involvement in the assignment of sex of rearing for an infant with ambiguous genitalia, techniques for surgical construction of unambiguous functioning female external genitalia and vagina (e.g., vaginoplasty, clitoridectomy and clitoral resection), indications and techniques for gonadectomy;

9. Contraception and Induced Abortion

Objectives:
The Fellow should understand and be able to discuss:

1. The pharmacodynamics, metabolic effects and complications of the various oral and injectable contraceptive preparations;
2. the mechanism of action and complications in intrauterine contraceptive devices (e.g., inert, copper and progestogen containing);
3. the indications, advantages, disadvantages, side effects, complications, and efficacy of traditional contraceptive methods (e.g., barrier, vaginal spermicide and periodic abstinence) as compared to non-utilisation of contraceptives;
4. male contraception and sterilisation (see also Infertility - Male);
5. female sterilisation (see also infertility - Female, and Surgical Techniques);
6. interruption of pregnancy, including: techniques of estimation of gestational age; the various techniques of pregnancy interruption (e.g., postcoital estrogen, menstrual

extraction, medically induced methods, dilatation and evacuation, mid-trimester abortion with prostaglandins and other agents); and details of the possible hazards and long-term fertility complications of such procedures;

7. potential techniques applicable to male and female contraception indicating any appropriate findings.

10. In-Vitro Fertilisation (IVF) and other Assisted Reproduction Techniques

Objectives:
The Fellow should be competent for independent clinical practice in:

1. conditions for which IVF and related techniques of assisted reproduction are appropriate;
2. determination of the menstrual cycle to plan synchronisation;
3. follicular stimulation and monitoring by ultrasound, steroid and peptide assays;
4. the timing of oocyte aspiration, laparoscopic, and ultrasound based procedures;
5. in-vitro gamete transport, maturation and fertilisation;
6. surgical and non-surgical methods of sperm retrieval and their use in assisted fertilisation.
7. timing and methods of embryo transfer;
8. monitoring of implantation;
9. assessment of genetic abnormalities and their potential treatment;
10. relevant aspects of cryobiology;
11. psychological assessment and management of gamete donors and recipients;

11. Laboratory Based Training

Objectives:
The Fellow should understand and be able to discuss:

1. tissue and cell structure;
2. biochemical methodology including extraction, purification and identification of steroid and protein hormones (e.g., steroids, proteins, receptors - membrane bound, including cyclic AMP generation and cytosol receptors, bioassays, bound versus free, steroid metabolism and appropriate statistical analysis, prostaglandins, LHRH, peptides, adrenaline, thyroxine etc);
3. enzyme kinetics as they relate to steroid and protein metabolism;
4. kinetics of production, distribution, interconversion and metabolism of specific hormones;
5. basic molecular biology techniques, including oligonucleotide probes, in situ hybridisation, Southern, Western and Northern blotting, restriction fragment length polymorphism, polymerase chain reaction;
6. national and local regulations related to laboratory safety, animal and human experimentation, radiation hazards etc.

12. Epidemiology, Research, Statistics and Audit

Objectives
The Fellow should be able to:

1. Understand epidemiological techniques (e.g. cohort studies and case control studies; cumulative rates calculation and assessment of bias);
2. understand population parameters and sampling techniques;
3. compute and interpret measures of comparisons of means and variations;
4. understand randomized controlled trials and techniques of meta-analysis;
5. analyze a presented experiment and construct a hypothetical experiment with respect to the following:
    - the question examined;
    - the hypothesis;
    - the sampling technique (including sampling bias and sample calculations;
    - the expression and correlation of raw data and simple (e.g. log) transformations
    - the selection and application of appropriate statistical tests;
    - significance of the results;
    - the conclusions;
    - the appropriate inferences which can be obtained. _
6. apply the following statistical tests
    a) parametric tests such as unpaired, paired, "t" tests, analysis of variance;
    b) non-parametric tests;
    c) correlation and regression;
    d) multi-variant analysis.
    e) chi-square analysis
7. define the terms "significance", "confidence interval", "Type I error" and "Type II error";
8. perform statistical analysis of assay data and evaluation of quality control;
9. understand the value of discussion and collaboration with statistical advisers;
10. understand disease surveillance systems and disease registries;
11. understand the need for organisation of and implementation of screening programs;

The Felolow should be familiar with:

- experimental design (e.g. laboratory, epidemiology);
- data acquisition, storage, interpretation and statistical analysis;
- scientific writing and presentational skills including the formulation of a grant application;
- conducting clinical audit and feedback and be able to utilise data collection systems.

The Fellows should have the opportunity to attend appropriate national and where possible international meetings relevant to their subspecialty annually.

13. Teaching

Objective
The Fellow should gain experience in teaching which will include:

1. some responsibility for teaching junior staff in their subspecialty area;
2. full participation in the unit's postgraduate programme with some administrative responsibility for the organisation of teaching in their subspecialty;
3. participation in the undergraduate teaching programme;
4. gain experience of appraisal and assessment techniques.

14. Ethical and Legal Aspects

Objective
The Fellow should be able to discuss the ethical and legal aspects of the clinical practice of their subspecialty and should have particular knowledge of the relevant areas listed below:

1. Legislation, particularly recent, relevant to their subspecialty practice;
2. Ethics of health care provision and resource allocation
3. medical confidentiality;
4. consent:
    a) nature of consent
        i. knowledge
        ii. capacity
        iii. voluntariness
    b) treatment of minors
    c) treatment of the incapacitated patient

5. medical negligence;
6. role and relevance of ethics committees;
7. Reproductive Medicine:

assisted conception techniques; detailed knowledge of national legislation and its relevance to the practice of:

- gamete storage and donation;
- surrogacy;
- fertility control;
- termination of pregnancy;
- fetal reduction;
- pre-implantation diagnosis;
- gene therapy;
- research on embryo;
- donation of fetal and ovarian tissue;
- role of the supervising Authority (if any), the code of practice as well as the role and duties of the "person responsible".

15. Administration

Objective
The Fellow should be given some administrative experience and responsibility which will allow the development of skills relevant to the future provision and organisation of clinical services. Types of relevant knowledge and experience are listed below:

1. Attendance at a management course;
2. an understanding of health service organisation and administrative and advisory structures;
3. An understanding of the mechanisms of health care purchasing, provision of care, resource allocation and contractual issues relevant to the clinical service;
4. Be cognisant of the need for regional referral systems and role of tertiary service in health care provision;
5. The system for managing hospital complaints;
6. Know how to review a service and formulate a business plan.

Definitions :

- Knowledge: basic understanding of topics not commonly used in the clinical practice of reproductive medicine.
- Detailed knowledge: Understanding of important aspects of topics which may be more comprehensively understood by a specialist in other discipline (e.g. geneticist).
- Comprehensive knowledge: Complete understanding of topics which are important in the clinical practice of reproductive medicine.

1-Basic sciences

1-1 Anatomy.

- Comprehensive knowledge of the regional anatomy of the pelvis, abdomen of female and male reproductive organs.
- Detailed knowledge of gross anatomy of hypothalamus , pituitary and adrenal glands
- Comprehensive knowledge of the histology of the genital tract and endocrine glands related to reproduction.
- Detailed knowledge of cell structure in relation to function.

1-2 Physiology

Comprehensive knowledge of human physiology with particular reference to the female and male reproductive system, fertilisation and implantation and early pregnancy . Knowledge of regulation and influence of vascularisation and micro circulation in the reproductive organs .

1-3 Genetics and molecular biology

Detailed knoledge of sexual differenciation .
Detailed knowledge of common inherited disorders.
Knowledge of the principles of inheritance of chromosomal and genetic disorders .
Detailed knowledge of chromosome of abnormalities involve in reproduction .

1-4 Embryology

Knowldege of the common fetal malformations
Comprehensive knowledge of gametogenesis and fertilization, of organogenesis and the early embryo development.
Comprehensive knowledge of abnormalities of developpement of the reproductive organs

1-5 Pathology

Detailed knowledge of the cytopathology and histology of the female and male reproductive tract.

1-6 Biochemistry

Knowledge of the metabolism of neurometransmetors ,receptors , autocrine and paracrine factors .

1-7 Biophysics

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

1-8 Immunology
Detailed Knowledge of immune mechanisms, and of the principles of reproductive immunology.

1-9 Pharmacology

Comprehensive knowledge of the properties, pharmacodynamics, actions, interactions and hazards of pharmacological agents which are used in reproductive medicine and particularly the compounds which could have a deleterous effect on reproductive tract

2-CLINICAL SCIENCES

2-1 Infertility

Comprehensive knowledge of epidemiology, causes, investigations and management of female and male infertility .

2-2 Endocrinology

Comprehensive knowledge of gynaecological and andrological endocrinology including its applications in reproductive medicine .

2-3 Reproductive Genetics

Detailed knowledge of genetic disorders related to female and male reproduction (infertility, recurrent abortions, etc).

2-4 Pediatric and adolescent

Detailed knowledge of normal and abnormal sexual development and of specific disorders affecting young females and males and adolescents .

2-5 Disorders of menstruation

Comprehensive knowledge of normal menstruation and of the pathophysiology of menstrual disorders , their investigation and management .

2-6 Andrology

Comprehensive knowledge of normal and abnormal spermatogenesis, as well as of testicular, epididymal and accessory sex glands physiopathology.
Comprehensive knowledge of erection and ejaculation, as well as their physiopathology.
Detailed knowledge of endocrine changes in the ageing male.

2-7 Climacteric problems

Detailed knowledge of pathophysiology, psychological disturbances in the climacteric and post climacteric including prevention, diagnosis and management.

2-8 Sexually transmitted disease

Detailed knowledge of epidemiology, aetiology, pathology and implications of male and female sexually transmitted diseases.

2-9 Family planning

Comprehensive knowledge of all methods of female and male contraception and sterilization

2-10 Assisted reproductive technology (ART)

Comprehensive knowledge of endocrine therapy, especially ovarian stimulation and its complications.
Comprehensive knowledge of the ART: insemination, IVF, ICSI.
Comprehensive knowledge of gamete and embryo donation.
Comprehensive knowledge of preimplantation genetic diagnostic techniques.

2-11 Reproductive Surgery

Comprehensive knowledge and skill in endoscopic and microsurgery including the use of Laser

2-12 Ultrasound

Detailed knowledge of ultrasonic aspects of:

- Normal pelvic anatomy in male and female
- Gynaecological diseases
- Andrological diseases
- Infertility
- Ultra sound guided invasive procedures.

2-13 Statistics and epidemiology

Detailed knowledge of statistical analysis and the collection of data in reproductive medicine, as well as of calculating effectiveness of infertility treatments.
Detailed knowledge of setting up and interpreting of clinical trials.
Detailed knowledge of environmental factors in relation to reproductive medicine.
Evidence based reproductive medicine.

2-14 Psychosomatic, psychosexual and stress related disorders

Detailed knowledge of the psychopathology and management of psychosexual disorders, and the influence of stress conditions such as:

- menstrual and ovarian dysfunction, chronic pelvic pain.
- anejaculation, impotence.

Detailed knowledge of the psychological implications of the different ART.

2-15 Ethics, law, resources

Detailed knowledge of ethical and national legal issues involved in reproductive medicine and ART in Europe and the resources required to provide for adequate health care in the hospital and community.