Preface
This training document outlines one of the subspecialist training programmes in Tertiary Care Paediatrics, defined by the European Union of Medical Specialists (UEMS). This programme has been designed by the European Society for Paediatric Endocrinology (ESPE) in cooperation with the European Board of Paediatrics. It is approved by the UEMS section of Paediatrics (CESP) and has the support of the Endocrinology and Diabetes section of the UEMS. This text was originally produced in November 1995 and submitted to CESP at the Annual Meeting in Graz 1996. Subsequent revisions have taken place in January 1997, March 1998 and June 1998.

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Education and Training Committee

- Background
  On the 20th March 1999 the Union of European Medical Specialities recognised Paediatric Endocrinology and Diabetes as a subsection of Paediatrics with its own Training and Education Programme. The European Board of Paediatrics asked ESPE at the Annual Meeting of the Board in May 1999 to act as agent for the Board in providing the Training for Paediatric
Endocrinology and Diabetes within the European Union (EU) Member States and within the States belonging to the European Free Trade Association (EFTA). To carry out this function it is proposed to create within ESPE an Education and Training Advisory Committee (ETAC).

**Composition of the Education and Training Advisory Committee in Endocrinology and Diabetes**

1. Each EU and EFTA Member State will nominate a representative to sit on the ETAC. The nominee should be representative of Paediatric Endocrine and Diabetes practice within that country and should ideally come from a National Society of Paediatric Endocrinology and Diabetes. The representative must be approved by the National Paediatric Body for that country. Non-EU/EFTA states may attend as observers.

2. The ETAC will elect a Chair, Vice Chair and Secretary from these representatives.

3. A representative of the ESPE Council.


5. A representative from the International Society for Paediatric and Adolescent Diabetes.

6. An educationalist.

**Constitution**

1. The Sub-Committee will be known as the "Education and Training Advisory Committee Endocrinology and Diabetes," hereafter referred to as the ETAC.

2. The Chair and Vice Chair, the Secretary and the Junior Doctors' representative will serve for a period of 4 years in the first instance and may seek reelection for a further 4 year session. It is accepted that the Junior Doctors position may change with circumstances. These terms will not run concurrently.

3. The ETAC will report directly to ESPE Council and the Chair or Deputy Chair will represent the ESPE at the Meetings of the European Board of Paediatrics.

4. The ETAC will meet at least once per year.

5. Each representative from a EU/EFTA state will carry one vote. Observers are not allowed to vote. Decisions will be by a majority vote.

**Role of the Education and Training Advisory Committee in Endocrinology and Diabetes**

1. Ensure that all trainees entering the Paediatric Endocrine and Diabetes programme have access to European and National based. Career advice at outset of Training and meet the European and National criteria for entry.

2. Supervise and monitor training standards in the EU and EFTA Member States in Paediatric Endocrinology and Diabetes in conjunction with the National Bodies and the European Board of Paediatrics. Work closely with non-EU States to ensure uniformity of Training throughout Europe.

3. Specify the training programme in Paediatric Endocrinology and Diabetes.

4. Liase with the European Board of Paediatrics and the National Bodies so that training programme and assessments meet the agreed
Standards and provide for the National Bodies an independent reference for internal disagreements over Training and Training Centre accreditation.

5. Determine with National Bodies that each Tertiary Care trainee has fulfilled requirements of the training programme and ultimately advise the European Board of Paediatrics to award European Certification in Paediatric Endocrinology and Diabetes.

6. Advise the European Board and the National Bodies on the suitability of other Doctors to be recognised as European and/or National Specialists in Paediatric Endocrinology and Diabetes.

7. Provide in conjunction with other bodies appropriate CME for General Paediatricians and Paediatric Endocrinologists/Diabetologists.

8. Determine and monitor in conjunction with the European Board of Paediatrics and National Bodies the criteria for recognition of Training Centres and Trainers. To provide independent opinion and advice to National Bodies in situations where accreditation issues are unclear or require arbitration.

Introduction

This document sets out the minimum requirements for training in Tertiary Care Paediatric Endocrinology and Diabetes. The document considers general and specific aspects of training in endocrinology and delineates the syllabus. General consideration is given to the structure of European Training and to the organisation of training in Europe. Training must lead somewhere and the current manpower situation in each Member State will need to be considered with the appropriate National Paediatric Body. Finally, training is not simply confined to Junior Doctors but forms an integral part of Continuing Medical Education. This too is considered in part.

Tertiary Care Paediatric Endocrinology and Diabetes was recognised as such by the Confederation of European Specialists in Paediatrics (CESP) at the Annual Meeting in Graz 1996 and is a subsection of CESP. The situation with respect to National Bodies varies within the European Union (EU). For example, in the United Kingdom pure subspecialty status is, as yet, not recognised in the award of a Certificate of Completion of Specialist Training (CCST). The Royal College of Paediatrics and Child Health (RCPCH) is prepared to consider issuing certification in the following:

- a. General Paediatrics with a Special Interest.
- b. Paediatric Endocrinology and Diabetes as a Subspecialist

A similar situation may pertain in other EU Member States. It is expected that there will continue to be a need for both types of individuals in the majority of Member States so the training programme will need to be modified to suit each Member State. This document concentrates on the Training required for practice as a Tertiary Specialist. Where Member States wish to create General Paediatricians with a Special Interest then their programme should be agreed with ESPE. In some EU Member States paediatricians are experts in diabetology but not in other fields of endocrinology. This fact is recognized as a specialist in paediatric
diabetology must not necessarily be a tertiary specialist in paediatric endocrinology. However, a tertiary specialist in paediatric endocrinology must have a good knowledge in diabetology, as defined in this document. The training programme intends to:

- Harmonise training programmes in Endocrinology and Diabetes between different European countries.
- Establish clearly defined standards of knowledge and skill required to practice Endocrinology and Diabetes at secondary and tertiary care level.
- Foster the development of a European network of competent tertiary care centres for Paediatric Endocrinology and Diabetes.
- Improve the level of care for children with complicated or chronic endocrine disorders.

Paediatric Training in Europe

The CESP is the specialist section of paediatrics of the European Union of Medical Specialities (UEMS). Represented are the member countries of the European Union and the European Free Trade Association. In addition CESP has admitted subspecialties to their meetings and after successful application in 1996 Endocrinology is represented by the European Society for Paediatric Endocrinology. The task of harmonising training programmes and training assessments through Europe lies within the remit of the European Board of Paediatrics (EBP) which has been specifically charged by CESP with this task. To achieve this EBP will recommend the standards for specialist training in paediatrics including training quality, syllabus and minimal standards for training centres. To this end recognition has been given to the diverse training needs of different types of Paediatrician and carefully constructed training programmes have been proposed. The EBP has designed the following training system:

A. **Common Trunk** - a three year training in basic Paediatrics which serves as the common basis and prerequisite for all other training programmes.

B. **Primary Care Paediatrics** - a 2-3 year programme to produce a General Paediatrician

C. **Secondary Care Paediatrics** - a 2-3 year programme producing a Paediatrician with or without a special interest practising in a hospital setting.

D. **Tertiary Care Paediatrics** - a 3 year programme to generate an individual with a commitment of greater than 0.6 Whole Time Equivalents employed in a hospital setting and academically active.

E. **Social and Community Paediatrics** - probably part of (B) but to be defined more adequately in due course.

The present training programme is largely devoted to providing for (C) and (D) but it is recognised that contributions will need to be made to the Common Trunk and probably (B). The status of (E) within European Paediatrics remains to be determined.
The training syllabus for the Common Trunk has been devised by the European Board of Paediatrics and will be published separately. **Considerable flexibility needs to be maintained to allow for individual choice and to allow for changes in direction by the trainee. All time requirements suggested should be viewed as the minimum.**

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### General Aspects of Training in Paediatric Endocrinology

#### General Principles

A medical doctor who has successfully completed his/her training of at least 3 years in the Common Trunk of Paediatrics will be eligible for access to further specialist training in Paediatric Endocrinology. **If a doctor is dedicated to Paediatric Endocrinology, training may be initiated at an earlier stage.**

Until a clearer picture emerges of the provision of Secondary and Tertiary services and the interrelationship between the two there will be no limitation on the numbers of candidates for specialist training other than that which arises as a result of the designation of Training Centres and Trainers. Each EU Member State at present will need to monitor its own Manpower in Endocrinology and Diabetes.

However, in order to ensure that there is a rising standard in Secondary Care Paediatrics particularly for emergency treatment of endocrine problems Training for this should be undertaken in conjunction with the Tertiary Care Programme.

Where Member States wish to encourage the Training of General Paediatricians with a Special Interest then the Training Programme should be discussed with ESPE and the National Body. A two level training programme is proposed which will allow for adequate training for Secondary and Tertiary Care Paediatricians.

#### 1. Foundation Course in Paediatric Endocrinology and Diabetes

The aim of the Foundation course in Paediatric Endocrinology and Diabetes training would be to provide training to allow competent practice at Secondary Care Level and for those Member States who wish to train General Paediatricians with a Special Interest. It is likely that such an individual would be expected to provide care for:

- the district diabetic population
- children with primary hypothyroidism
- individuals with delayed puberty
- growth hormone deficient children
- short and tall stature children
- children with obesity

and as such it would be expected that such an individual would have covered at least 4 out of these 6 areas. Each of these areas can be considered a
module (See section on Training Syllabus Delivery). More complex endocrine problems could be cared for locally but only in the context of a joint Consultative Clinic held with a Tertiary Care Paediatric Endocrinologist. This concept of a joint working partnership is central to this proposal. This could take the form of outreach clinics held jointly and/or the Paediatrician with an Interest working with the Tertiary Specialist in Paediatric Endocrinology at their Endocrine Centre. Entry would take place after the Common Trunk and after 1 year of the Secondary Paediatric Training. One to two years would then be spent in Paediatric Endocrinology and Diabetes. It should be possible also with this type of training to gain accreditation in Diabetes only. The training to secondary level paediatric endocrinologist should preferably include clinical research activity.

2. **Advanced Course in Paediatric Endocrinology and Diabetes**

The aim of the Advanced course in Paediatric Endocrinology and Diabetes training would be to provide training to allow competent practice to be undertaken as a Tertiary Care Specialist in Paediatric Endocrinology and Diabetes whose practice would be expected to deal with complex endocrinology:-

- disorders of the adrenal gland
- ambiguous genitalia
- disorders of the anterior and posterior pituitary gland excluding isolated growth hormone deficiency
- hyperthyroidism
- complications of diabetes
- diabetes with poor metabolic control
- early puberty
- hypoglycaemia
- disorders of calcium metabolism
- liaison with adult and paediatric colleagues re complex cases eg. post oncology.

and as such it would be expected that in addition to the Foundation Course the Specialist would have covered at least 7 of these 9 areas. Each of these areas can be considered as a module (See section on Training Syllabus Delivery). Entry would take place after the Common Trunk and after 1 year of Secondary Paediatric Training. They would then complete a 3 year dedicated programme in Paediatric Endocrinology. The programme need not be as segregated as this. Rather an integrated approach could be taken which will include an excellent exposure to clinical Paediatric Endocrinology, time to develop a research interest (continue one) with periods of time dedicated towards laboratory experience/adult liaison.

Time spent in Research should be viewed as essential for a Specialist in Endocrinology and Diabetes with a minimum period of 1 year to be spent in Research and ideally 3 years. A higher degree (MD or PhD) is desirable. If training/research in Pediatric Endocrinology is performed on a part-time basis, the time to complete training must be extended to compensate for this. Emphasize should be on achieved skills.
3. **Flexibility and Continuing Medical Education**

There is a need to maintain flexibility. This will allow those who are undecided to pursue Secondary Training and then change across to Tertiary Training if they wish and also allow those who embarked on Tertiary Training to go to be a Secondary Care Paediatrician if specialist practice is not for them.

Further it is clear that individuals within each of the two groups may wish to develop personal skills in certain areas. It is clear that different levels of clinical responsibility are expected from the two groups although it is clear that this is based on the experience gained as trainees. It is envisaged that by employing a modular approach to the Endocrinology and Diabetes training that a person's accreditation might be modified with time if they underwent subsequent modular training in certain components of the advanced course eg. disorders of the adrenal gland.

4. **Research Training**

Apart from a suggested year of clinical research there is no active programme at present for prosecution of a research programme within the European Programme. It is unclear when this should be conducted but suggestions now centre on attainment of a MD/PhD by prosecuting research with the aim of *presenting a thesis*. These arrangements will need to be negotiated with the National Body. Where Academic University appointments are available for a 4 year period this time should be devoted largely to research with a clinical research ratio of 1:3.

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**Contents of Training**

Paediatric Endocrinology is part of the Common Trunk and this has been developed by the EBP and will be published as a separate document from CESP in due course. The principles of training required for Secondary and Tertiary Care Paediatric Endocrinology and Diabetes Higher Specialist Training can be broken down into core training and multi-disciplinary training and a more detailed syllabus with a break down of subjects into the Foundation and Advanced Course components is provided in Appendix 1. The section on Training Syllabus Delivery details the modular structure.

1. **Core Training**
   This should involve the following:
   i. **Background**
      - A thorough modern grounding in the normal physiology of the endocrine system including the physiology and biochemistry of hormones and their actions.
      - Embryology of the endocrine system including that of the reproductive organs coupled with extensive knowledge of the pathophysiology of disorders of the genital tract are required.
      - Physiology and pathophysiology of growth along with knowledge of the principles and practice of anthropometric assessment.
ii. **Endocrinology**
Extensive first hand practical experience in a recognised training centre of the management of diseases primarily involving the endocrine system. These should include disorders of the following:-
- the thyroid gland
- the neuroendocrine system (hypothalamus and pituitary)
- the adrenal glands
- endocrine function of the gonads
- the endocrine system in growth and development
- hormonal control of blood pressure.
- fluid and electrolyte disorders

In particular a detailed knowledge of clinical laboratory and genetic management of adrenal disorders particularly adrenal hyperplasia and disorders of sexual differentiation are essential.

iii. **Diabetes**
Extensive experience in all aspects of diabetes mellitus and its acute complications, and good knowledge of long term complications of diabetes. This includes:
- Management of acute problems particularly diabetic ketoacidosis and cerebral oedema
- Advising diabetes monitoring and evaluation of control.
- Early detection and prevention of eye, kidney, neurological and vascular complications.
- Secondary diabetes (associated with e.g. cystic fibrosis, steroid treatment and other medications).
- Knowledge of the association between type 1 diabetes and other diseases (e.g. polyendocrine syndromes, association with thyroid disease, adrenal disease, celiac disease).
- Knowledge of the treatment of other types of insulin lack occurring in childhood (e.g. maturity onset diabetes of the young (MODY), transient neonatal diabetes).
- Type II diabetes
- Psychological and community aspects of chronic illness in childhood.
- Skills in diabetes education for children, adolescents and parents (preferentially in teamwork).

iv. **Metabolic disease**
First hand practical experience in metabolic and nutritional disorders including the following:-
- hypoglycaemic disorders and acute metabolic diseases
- endocrine obesity and its complications

v. **Laboratory endocrinology**
An understanding of the principles and practice of hormone assay methods and the use of diagnostic tests is essential. Training should include practical experience in an endocrine laboratory and the endocrinologist should have access to an up-to-date hormone assay service which should participate in national quality control schemes.
An understanding of the principles and practice of cellular and/or molecular biology techniques particularly with respect to endocrine disorders. Practical experience is desirable but not essential. The laboratory work experience may be obtained as part of a research post.

2. Multidisciplinary Training
   i. Clinical
      This is particularly important in the following areas:-
      - liaison with adult endocrinologists is essential and could be provided within the setting of joint adolescent clinics.
      - liaison with other paediatric subspecialties particularly those in which endocrine complications of the disease process are important eg. post oncology therapy and renal disease.
      - surgical endocrinology: involvement in pre- and post-operative management of pituitary disease, diabetes and thyroid disease.
      - access to and experience with imaging facilities for endocrine disease such as radioisotopes, ultrasonography and magnetic resonance imaging.
      - involvement with a multidisciplinary team in the management of disorders of sexual differentiation eg. gynaecologists, andrologist, urologists, molecular biologists and biochemists.

Biostatistics
Background knowledge of statistical and epidemiological principles should be included in training programmes as part of the research training to allow for critical appraisal of publications, reviews and audit programmes.

ii. Audit
    Exposure to and practical involvement in clinical audit should be considered as an integral part of all training programmes

iii. Personal Development
    Acquisition of management and educational skills.

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End Result of Training
The training programme envisaged and detailed in Appendix 1 will provide for the needs of:
- Secondary Care Paediatricians who will deliver emergency care and for the conditions outlined under the Foundation Course if appropriate to the National Structure.
- Tertiary Care Paediatricians who will deliver care for the conditions outlined under the Advanced Course.

The Tertiary Care Endocrinologist, at the end of training, should:

- Provide clinical care within the framework of a specialised Tertiary Care Unit in the inpatient/outpatient setting using various specialised diagnostic and therapeutic modalities.
- Liaise with colleagues in Secondary Care Paediatrics in the provision of high quality local care.
- Liaise with and consult to other Tertiary Care Specialists.
- Develop an integrated pattern of care with colleagues in the Adult Speciality.
- Be trained in Clinical Research Practice and capable of conducting/establishing a Research Programme.
- Lead on health administrative issues and research activities.

Requirements for Training Institutions

The recognition of training institutions will ultimately be part of the remit of a CESP Standing Advisory Committee (SAC) for Endocrinology and Diabetes. It is anticipated that ESPE will act as the agent for the European Board of Paediatrics and CESP in executing this task. A list of the names and characteristics of existing national training centres in endocrinology and diabetes will be created and held by SAC/ESPE/EBP which will organise in a structural manner quality assurance of the recognised centres at periodic intervals every 5 years using the guidelines suggested by the UEMS.

A training centre can be a single institution or a group of related establishments. **Full Training Centre** - The centre must provide adequate experience in all fields of endocrinology including emergency care. It is expected to provide all Training modules. A full component of the Foundation and Advanced Courses must be provided. The number of activities must be sufficient to provide at least a minimum experience for a trainee. A group of related establishments can be considered a centre and each component considered as a unit contributing one or more modules to either the Foundation or Advanced Course.

The centre must have easy access and close relationships with other relevant specialties such as nuclear medicine, imaging facilities, surgery and endocrine laboratory facilities. Demonstration of involvement of other care teams particularly specialized diabetes nurses, pediatric nutritionists, social workers, and psychologists is essential for recognition. and others who may contribute to the quality of care of patients with endocrine.

The centre must provide evidence of ongoing clinical research and access to basic research. In countries that have approved centres for diabetes 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 endocrinology/diabetes should be immediately available and there should be easy access to a comprehensive reference library either in paper or electronic format.

**Training Unit** - Training Units are institutions that provide training in one or more aspects (Modules) of the Foundation and/or Advanced Courses. They must provide adequate exposure in the defined area and a teacher who is deemed competent in these areas.

**Requirements for Teachers in Paediatric Endocrinology/Diabetes**

The training staff in a Centre should include at least two teachers. The **Coordinator of Paediatric Endocrine/Diabetes** Training must have been practising Paediatric Endocrinology and Diabetology for at least 10 years and have specialist accreditation. There should be additional Paediatric Endocrine/Diabetes Tutors who should provide training in all aspects of the speciality and hold a research tradition in Paediatric Endocrinology. When an aspect of training cannot be provided in one centre it would be necessary for the trainee to be taught elsewhere by a teacher (Paediatric Endocrine/Diabetes Teacher) approved for that purpose. A Teacher is a person who holds acknowledged expertise in one or several aspects of Paediatric Endocrinology/Diabetes. This person's contribution may be restricted to these areas of expertise. Both Tutors and Teachers must have practised Paediatric Endocrinology/Diabetes for a minimum of 5 years.

The teacher should work out a training programme for the trainee in accordance with the trainee's own qualities and the available facilities of the institution. The plan will be submitted to the Coordinator for approval. In the event of disagreement ESPE with the European Board will be the final arbiter. Regular review will be required to allow for flexibility and to allow for early identification of problems/deficiencies. Teachers are expected to provide appraisal and assessment of progress. Appraisal consists of sorting out what is needed and what is the evidence that this has been executed. Assessment concentrates on what is needed. 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 teachers in the centre. A tutor, preferably an external teacher, should be appointed to act as an impartial assessor/mentor for the trainee.

Teachers 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 3 monthly intervals to appraise the individual. An annual assessment should be undertaken to state 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. Reports will be submitted to the Coordinator.

Each trainee on a secondary level should be assigned a mentor in a tertiary paediatric endocrine clinic.

Requirements of Trainees

In order to gain the necessary depth of experience each trainee should be actively involved in the management care of different endocrine patients during the whole period of his/her speciality training. This should include the care of outpatient and inpatients and patients with endocrine emergencies where possible. The trainee should keep a written record of patients seen by themselves, procedures conducted, diagnosis and therapeutic interventions instigated and followed-up. This will constitute in part the logbook. The trainee will be required to keep his/her personal logbook or equivalent up-to-date according to National guidelines and European Union directives. The logbook must be endorsed by his/her tutor or authorised deputy.

The trainee should attend and provide evidence of attendance at local, regional and national Endocrine and Diabetes Meetings. Attendance at International Meetings is not essential for the Foundation course but is considered essential for the Advanced course. A Foundation course member is recommended to give at least 2 and an Advanced course student at least 3 presentations at these meetings.

Participation in one Audit project for Foundation course and two for Advanced course students. Advanced course students should conduct one systematic style review of a topic and in addition prepare a detailed evidence based appraisal of a diagnostic test or a therapeutic intervention.

The Trainee is encouraged to provide as evidence of training a series of Signs of Personal Development. These should include:

- Broad experience of endocrinology within a single centre and between centres including work in other countries.
- Attainment of Higher Degrees (MD or PhD).
- Creation of Trainee Portfolio which would include, log-book, abstracts of work presented, reviews, self-directed learning activities (SDLA) and evidence based appraisals. Creation of clinical management workbook. SDLA includes reading activities, tutor discussions, self-teaching projects, teaching and presentation and participation in computer/distance based learning schemes.
- papers published in International peer reviewed journals. At least one as first author.
- papers presented at International Endocrine Meetings.

In the longer term for European Board of Paediatrics Certification in Paediatric Endocrinology an examination may need to be considered in addition to the above. This would be a practical examination of the trainee's approach to a series of clinical situations. Return to Contents
Accreditation of Centres

For each EU Member State, a list of centres, units, training directors, tutors and teachers should be compiled and updated on an annual basis. Each centre is defined by the available modules or areas of teaching activity, 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 National Paediatric Body and ultimately by ESPE. The process for National Representation in ESPE will be evolved with time and the inspection and approval process will follow the EU Guidelines currently in preparation. At present ESPE will simply review National Inspections and act as arbiter in situations of disagreement.

Delivery of the Training Programme

The delivery of the Training Programme relies on the recognition of centres and teachers as described above along with the process required for trainee assessment. In order to facilitate these processes a modular approach to the Programme is outlined. The modular approach allows for:

- Trainee assessment in either the Foundation or Advanced Courses or both.
- Assessment of Training Centres or Units in terms of what they can deliver.
- Development of CME in the true sense of the concept with post-accreditation in add-on Modules. This will allow flexibility between Secondary and Tertiary Care to develop.

The Foundation and Advanced Modular approach involving Secondary Care is the preferred mode of Training in the EU Countries in Endocrinology and Diabetes because of the wish of Member States to promote the development of higher quality services for growth disorders and diabetes at the Secondary level.

1. **Foundation or Obligatory Modules**
   - **Clinical Foundation Studies in Endocrinology**
     - **Module BK: Basic knowledge of Endocrine Science.**
       This should include the general principles of molecular biology, transport, biochemical actions and control of hormone secretion and secondary messenger signalling systems, the neuroendocrinology of the anterior and posterior pituitary hormones, steroid biosynthetic pathways and the basic immunology with an emphasis on autoimmunity. A working knowledge of the embryology of the endocrine system and of the genital tract is expected.
     - **Module GA: Growth Assessment**
       The principles and practice of growth assessment including height, weight and pubertal assessment. Uses of growth charts and quality control of growth measurements.
     - **Module GB: Bone Age Assessment**
       Assessment of bone age and determination of height prediction.
Determination of bone age and height prediction in 50 patients with normal and abnormal growth.

- **Module PM: Patient Management**
  Evidence of outpatient and inpatient assessment of the conditions listed below (numbers indicate the minimum number of cases). This includes recognition, institution of diagnostic tests, interpretation and outline management. Creation of clinical management workbook.

- **Module PMT: Hypothyroidism**
  Diagnostic procedure and interpretation of 15 cases with hypothyroidism. Where practical (and mandatory in some EU Member States) 20 ultrasound studies of the thyroid.

- **Module PMG: Growth Disorders**
  Diagnostic procedure and interpretation of 50 cases with significant growth disorders and therapeutic management and monitoring of 15 cases.

- **Module PMH: Hypoglycaemia**
  Emergency management and diagnostic investigation.

- **Module CAM: Clinical Audit and Management**
  Evidence of audit and management activity as outlined in Syllabus.

- **Module TA: Therapeutic Agents**
  Use of therapeutic agents for Module PM with understanding of pharmacokinetics/dynamics of agents used, side effects and potential for drug interactions.

- **Module DM: Diabetes Mellitus**

- **Module DMG: General Issues in Diabetes**
  Physiology of insulin action and metabolic effects of insulin deficiency. Knowledge of the pharmacology of insulin.

- **Module DAC: Acute issues in Diabetes**
  Presentation of type 1 diabetes mellitus in infancy, childhood and adolescence and management of diabetic ketoacidosis, hyperglycaemia, hypoglycaemia and cerebral oedema. Management of diabetic patients during surgery.

- **Module DLT: Long term issues in Diabetes**
  Complications of diabetes and diabetes associated with other diseases eg cystic fibrosis and mitochondrial disorders. Management of 40 patients with diabetes mellitus.

- **Module DAD: Adult Diabetology**
  Sessions with adult diabetologists/nephrologists/opthalmologists. With particular reference to Type 2 Diabetes.

- **Module LE: Laboratory Endocrinology**
  Principles of good laboratory practice and the limitations of commonly used endocrine tests.

- **Module MTR: Multi-disciplinary Training**
  The role of joint adolescent clinics in providing endocrine/diabetes needs for young adults and transferring to adult endocrine/diabetes practice. Adolescent perspectives of chronic illness. Develop teamwork approach to diabetic care,
dietician, nurse specialists, psychologist and the concept of diabetic in the family and community.

- **Academic Foundation in Endocrinology**
  - **Module BS: Basic Statistics**
    Cover appropriate topics in Syllabus section.
  - **Module ED: Education**
    Self directed learning projects, literature searching, presenting information and consultation practice

2. **Advanced or Desirable Modules**
   - Advanced Clinical Studies in Endocrinology
     - **Module CE: Complex Endocrinology**
     - **Module CET: Thyroid**
       Molecular and immunological mechanisms of thyroid disease. Management of 10 cases with goitre or hyperthyroidism.
     - **Module CEN: Neuroendocrine**
       Disorders affecting anterior and posterior pituitary function other than idiopathic isolated Growth Hormone problems. Diagnostic procedure and interpretation of 10 cases with hypothalamic-pituitary disorders which must include the management of pituitary dependent Cushing's and post-operative management of craniopharyngioma/pituitary surgery.
     - **Module CEA: Adrenal**
       Molecular and steroid biochemistry of adrenal disorders. Diagnostic procedure, interpretation and therapy of 10 cases with adrenal disorders.
     - **Module CEG: Ambiguous genitalia**
       Molecular and biochemical background to disorders of sexual differentiation. Multi-disciplinary approach to the management of the problem. Detailed clinical workbook presentation of at least 4 different types of problem.
     - **Module CEC: Calcium Disorders**
       Molecular and biochemical background to disorders of calcium metabolism. Diagnostic procedure and interpretation of 5 cases with disorders of bone or calcium/phosphorous metabolism.
     - **Module CEM: Endocrine Metabolic Disorders**
       Diagnosis and management (medical and surgical) of hypoglycaemia.

- **Module CL: Complex Laboratory Work**

- **Module MT: Multi-disciplinary Training**
- **Module MTA: Adult Endocrinology**
  Attendance at Adult Endocrinology clinics (formal involvement for 6 months). Implications of childhood endocrine disease for Adult Endocrinology.
Module MTT: Adolescent Transfer
The role of joint adolescent clinics in providing endocrine/diabetes needs for young adults transferring to adult endocrine/diabetes practice. Participation in this process. Adolescent perspectives of chronic illness

Module MTE: Endocrine Complications of other Paediatric Diseases
Experience of joint clinics/liaison in at least one of the following:
- oncology and radiotherapy
- renal disease
- respiratory disease

Module MTS: Surgical Management of Endocrine Disease
Experience of liaison regarding management of patients with pituitary, thyroid, pancreas and adrenal disorders and the post operative care of these individuals.

Advanced Academic Studies in Endocrinology

Module AS: Advanced Statistics
See Syllabus Section G.

Module RS: Research Activities
Attendance at local, regional and national Endocrine and Diabetes Meetings and at least 3 International Meetings. Participation in two Audit projects, one systematic style review of a topic and preparation of a detailed evidence based appraisal of a diagnostic test or a therapeutic intervention. Two papers as first author published in International peer reviewed journals. Preferably, a PhD or MD degree should be an integrated part of the tertiary training in paediatric endocrinology, diabetes and metabolism

Attendance at local, regional and national Endocrine and Diabetes Meetings.

National Training Programmes

1. EU Countries with Existing Programmes
National training programmes in Paediatric Endocrinology/Diabetes that already exist, or are in an advanced stage of development should be considered as compatible when they:
   - have a content that is comparable (not strictly identical) with the European programme.
   - has a duration that does not differ by more than one year from the European programme.

Each National syllabus should be closely scrutinised by ESPE/ISPAD for compatibility. If compatible the trainees within that programme would be considered as acquiring the title of "European Paediatric Endocrinologist. "

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2. **EU Countries without Existing Programmes**
   National professional medical bodies should be encouraged to adopt a National training programme in Paediatric Endocrinology and to structure it in close compatibility with the European model. Until implementation of such a national training programme, individuals should have the opportunity to train according to the European programme and to document their progress in a similar fashion. Review of progress would be made by the European Board of Paediatrics in conjunction with ESPE.

3. **Non-EU European Countries with Existing Programmes**
   If the national training programme is found to be compatible with the European programme then the trainee can be awarded the title of "European Paediatric Endocrinologist."

4. **Non-EU European Countries without Existing Programmes**
   On a voluntary basis, the same arrangements as listed under "EU Countries without existing programmes" should apply.

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**APPENDIX 1**

**European Society for Paediatric Endocrinology Syllabus for Tertiary Training in Endocrinology and Diabetes**

The components of the two courses are denoted by (F) Foundation and (A) Advanced. All expected to cover sections A, C, E, F, H, I and J. As Endocrinology and Diabetes are predominantly Outpatient Specialities it isn't possible to state precise times to be spent in each module. Competence rather than time spent in a module/teaching area is desired. As a result Training Centres/Modules are defined on patient numbers seen at the centre as well as the case-mix. The trainee should keep a written record of patients seen by themselves, procedures conducted, diagnosis and therapeutic interventions instigated and followed-up.

**A. Foundation Studies in Endocrinology**

**Basic knowledge**

- general principles of molecular biology. Specific reference to the molecular regulation of the GH gene and steroid hormone action at the molecular level
- secondary messenger signalling systems used in the endocrine system
- neuroendocrinology of the anterior and posterior pituitary hormones and their action
- transport, biochemical actions and control of hormone secretion
- steroid biosynthetic pathways
- embryology of the endocrine system
- embryology of the genital tract and molecular basis for sexual differentiation
- principles of growth assessment
- Basic immunology with an emphasis on autoimmunity
Skills

- ability to conduct an anthropometric assessment, assessment of skeletal maturation and prediction of final height and staging of pubertal development.

Resources

- endocrine clinics
- liaison with basic scientists
- sessions dedicated to basic science issues
- structured in-house, ESPE Summer School, endocrine teaching course
- National and International postgraduate courses including ESPE Summer and Winter
- annual meetings of National and International Endocrine Societies including ESPE

Evaluation

- clinical progress
- course attendance
- supervision of anthropometric techniques
- membership of learned endocrine societies eg. National Endocrine Societies, Endocrine Society (USA), European Society for Paediatric Endocrinology.

Literature

- Clinical and basic science reviews in Journal of Clinical Endocrinology and Metabolism, Endocrinology, Endocrine Reviews, Clinical Endocrinology and Journal of Endocrinology
- De Groot LJ. Endocrinology. Saunders, Philadelphia
- Fima Lifshitz ed. Pediatric Endocrinology, Dekker

B. Principles and Practice of Endocrinology for Foundation and Advanced Courses

Basic knowledge

- recognise, initiate diagnostic tests and outline management and referral criteria (F) of:
- hypo (F) and hyperthyroidism goitre and nodules
- neuroendocrine system eg. Cushing's disease (A)
- adrenal hyper and hypo states including congenital adrenal hyperplasia (A)
- early and late sexual development (F)
- ambiguous genitalia (A)
- short stature, growth delay, excessive growth, and (F)
- hypoglycaemia (F)
- fluid and electrolyte disorders (F)

  o evaluate biochemical, radiological and other tests used in endocrine practice (F)
  o pharmacology of (commonly used (F)) therapeutic agents (A)
  o management of endocrine problems in adolescence (A)

Skills

  o administer and interpret investigations for endocrine disorders particularly the following:
    - anterior and posterior pituitary function tests
    - endocrine function tests (and in some EU Countries ultrasound studies of the uterus and ovaries) in the diagnosis of disorders of sexual differentiation and pubertal development
    - thyroid function evaluation (and in some EU Countries ultrasound studies of the thyroid). Interpretation of the results of neonatal screening for congenital hypothyroidism.
    - endocrine function and radiological assessment of adrenal dysfunction including neonatal evaluation of CYP21 deficiency from the biochemical and molecular standpoint and the role of antenatal diagnosis and treatment.
  o competence in understanding pharmacokinetics/dynamics of therapeutic agents used
  o development of effective communication strategies

Resources

  o distance based learning
  o local endocrinology protocols and clinical service guidelines
  o courses on communication techniques

Evaluation

  o attendance at clinics. Personal involvement in management of conditions.
  o individual case discussion
  o real data interpretation

Literature

C. Diabetes

Basic knowledge

- Carbohydrate, fat and amino acid metabolism and its enzymatic and endocrine regulation.
- Physiological effects of insulin and insulin deficiency
- Physiology of insulin action.
- Genetics, immunology, epidemiology and aetiology of type 1 diabetes
- Presentation of type 1 diabetes in infancy, childhood and adolescence
- Management of diabetic ketoacidosis, hyperglycaemia, hypoglycaemia
- Cerebral oedema management
- Pharmacology of insulin
- Complications of diabetes
- Diabetes associated with other diseases eg cystic fibrosis and mitochondrial disorders
- Predictors of type 1 diabetes and intervention studies
- Management of type 1 diabetes in adolescence
- Obesity and type 2 diabetes. Concept of insulin resistance.
- Management of type 2 diabetes
- MODY
- Lipid disorders, celiac disease, hypothyroidism associated with diabetes

Skills

- Acute management of type 1 diabetes, role of ITU
- Injection and monitoring skills
- Insulin pumps
- Develop teamwork approach to diabetic care, dietician, nurse specialists, psychologist
- Develop concept of diabetic in the family and community
- Administer and/or interpret tests to detect diabetic complications
- Laboratory experience of glycated protein analysis

Resources

- Register of diabetic patients
- Quality register
- Dedicated paediatric diabetic clinic
- Team approach to diabetic care. Act as observer and team member on consultations/follow-up
- Laboratory liaison
- Sessions with adult diabetologists/nephrologists/ophthalmologists

Evaluation
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- clinic attendance monitoring and follow-up of diabetic children
- individual case discussion and presentations
- tracking of changes in markers of control with respect to intervention
- research opportunities

**Literature**


**D. Metabolic Disease (A)**

**Basic knowledge**

- metabolic bone disease and calcium disorders.
- diagnosis and management of hypoglycaemia (F)

**Skills**

- ability to administer and interpret investigations

**Resources**

- single or multiple endocrine centres may be required to cover this area in-depth

**Evaluation**

- attendance at clinics and personal involvement
- individual case discussion
- real data interpretation

**Literature**


**E. Laboratory Endocrinology**

**Basic knowledge**

- principles of good laboratory practice (F)
- principles of radioimmunoassay and newer technologies eg. ELISA, chemiluminescence
- difference between immuno and bioassays
- steroid hormone analysis by chromatography and mass spectroscopy
- assessment of assay performance and quality control
- principles of molecular biology
  - analysis of DNA and RNA
  - role of PCR
  - semi quantitative assessment
- importance of sample collection
- limitations of commonly used endocrine tests (F)

Skills
- perform an immunoassay

Resources
- time spent in endocrine laboratory
- time spent attached to molecular biology group
- Molecular biology courses

Evaluation
- completion of laboratory work to satisfaction of laboratory manager
- regular review of laboratory methodology as applied to clinical practice

Literature
- Edwards, R. Immunoassay. An introduction. William Heineman Medical, London,
- Thakker R (ed). Genetic and molecular biological aspects of endocrine disease. Balliere,
- Strike, PW. Medical Laboratory Statistics. John Wright & Sons Ltd, Bristol,

F. Multidisciplinary Training (A)

Basic knowledge
- the role of joint adolescent clinics in providing endocrine/diabetes needs for young adults transferring to adult endocrine/diabetes practice
- adolescent perspectives of chronic illness
- implications of childhood endocrine disease for Adult Endocrinology
- endocrine complications of other paediatric diseases
  - oncology and radiotherapy
  - renal disease
  - respiratory disease
- the role of surgery in managing endocrine disease
- application of imaging techniques to endocrine evaluation

Skills
- managing multidisciplinary teams

### Evaluation

- attendance at Adult Endocrinology clinics (formal involvement for 6 months)
- attendance at joint paediatric subspecialty clinics for the long term follow-up of complex endocrine problems
- visit to hospital imaging services. Liaison with imaging practitioners.

### Literature

- Hofmann A. Adolescent Medicine. Addison Wesley, California

### G. Biostatistics

#### Basic knowledge

- application of parametric and nonparametric statistics (A)
- statistical modelling (A)
- method comparison studies (A)
- principles of screening and surveillance programmes (F and A)
- study design (A)
- principles of health economics
- evidence based endocrinology (F and A)
- critical appraisal of literature (F and A)
- principles of systematic reviews (A)
- place of information technology in clinical and research practice (F and A)

### Resources

- university statistics clinic
- sessions with Health Services Research personnel
- local IT network

### Evaluation

- critical appraisal of literature
- worked examples
- trial design
- construction of scientific paper/presentation

### Literature
o Statistical/health service reviews in New England Journal of Medicine, Lancet, British Medical Journal, Evidence Based Medicine
o Altman DG. Practical statistics for medical research. Chapman and Hall, London,
o Bailar JC, Mostellar F. Medical uses of statistics. New England Journal of Medicine Books, Boston

H. Audit

Basic knowledge

o the audit cycle
o identification and conduct of audit studies
o promoting change

Resources

o disease registers
o hospital audit departments

Evaluation

o example(s) of audit process in action

Literature

o reviews and reports in general medical journals.

I. Management

Basic knowledge

o time management
o chairing meetings and team participation
o appraisal and assessment
o health economics and service provision

Resources

o management courses run by the Kings Fund or other agencies
o liaison with clinical director

Evaluation

o report on courses attended
o review of departmental working practices
Literature

- regular review articles in British Medical Journal/Lancet/New England Journal of Medicine

J. Education

Basic Knowledge

- defining aims of teaching course/programme/lecture
- targeting different audiences
- preparation of teaching material

Resources

- distance based learning using Web site
- education in pedagogics, courses
- students

Evaluation

- presentation of lectures to different audiences
- bedside teaching programmes
- educational material developed