ENDOCRINOLOGY FELLOWSHIP TRAINING PROGRAMME

CURRICULUM
March 2008

Endocrinology Fellowship Committee
Ministry of Health, Malaysia

ENDOCRINOLOGY SUBSPECIALTY FELLOWSHIP TRAINING PROGRAMME KKM

1. OBJECTIVES

The objective of this training programme is to provide advanced training and experience at a level for the trainee to acquire the knowledge, skills, attitudes and experience required to produce an endocrinologist who is clinically skilled and sufficiently competent to function independently as a specialist in the field.

2. ENTRY REQUIREMENT

Entry requirements for Specialty Training in Endocrinology & Diabetes are as follows:

i. Candidates should hold a recognized qualification in Internal Medicine such as M.Med (Internal Medicine) from any local universities, MRCP (UK or Ireland) or an equivalent.

ii. Candidates will be eligible for training in Endocrinology and Diabetes 12 months after gazettement as a specialist post MMed or MRCP.

Candidates who fulfil the above requirements will be called for an entrance interview with the Endocrinology Fellowship Committee prior to entry into the fellowship programme.

Intake into the fellowship programme will be twice in the year, in January and July, unless otherwise decided on by the Endocrinology Fellowship Committee.

3. GOALS

1. To learn basic and advanced endocrine biochemistry, physiology and pathophysiology, which provide the basis for understanding endocrine disease.

2. To accumulate a critical mass of fundamental information and practical approaches for the diagnosis, management and prevention of endocrine disorders.

3. To acquire the technical and practical skills that are required by a consultant in endocrinology, diabetes and metabolism.

4. To acquire clinical skills in a progressive fashion and with increasing responsibility appropriate for a consultant in endocrinology, diabetes and metabolism.

5. To acquire knowledge and skills necessary for providing cost-effective, ethical and humanistic care of patients with diabetes and disorders of endocrinology and metabolism.

6. To acquire knowledge and skills necessary for critical analysis of the laboratory testing and the endocrine literature.

7. To acquire skills in design and performance of hypothesis-driven endocrine research, and to participate in such research or equivalent scholarly activity. This may include gaining extensive experience in grant writing and scientific presentation.

4. DURATION OF TRAINING

A minimum period of three years is to be spent in specialty training, of which at least one year may be spent overseas. The candidate should spend at least 2 years in a clinical department providing care for persons with endocrine disorders and diabetes. Exposure to Paediatric Endocrinology is desirable.

A one week period is to be spent in a endocrine laboratory lectures, 1 week "hands-on" and in Imaging Department providing facilities for investigation of endocrine disorders.

Each participant in the programme must be responsible for at least one research project leading to publication OR presentation of research thesis.

5. TRAINING CENTRES AND TRAINERS

Minimum Requirements for Accreditation as a Centre for Advanced Training in Endocrinology and Diabetes.

- Centres must have at least one endocrinologist who has a minimum of 2 years experience in the field

- Centres should have outpatient, in-patient as well as ICU facilities for patients suffering from endocrine disorders.

- There should be ready access to nuclear medicine and radiological facilities.

- There should be ready access to reliable laboratory facilities which should include assay facilities for hormone studies.

- There should be ready access to surgical expertise for endocrine surgery and neurosurgery

- The training centre should have facilities and opportunities for postgraduate education e.g. library, seminars journal club, liaison with other departments e.g. cardiology, nephrology, ophthalmology, orthopaedic surgery, pathology, etc.

The number of training posts in a centre will be based on the number of trainers and the volume and scope of work available. The ratio of trainer: trainee should not exceed 1:2

Trainers should be accredited based on their qualifications, experience and interest in teaching. A trainer should have a minimum of 2 years working experience in the subspecialty after being gazetted in the field.
At present the following training centres and trainers are recognized:

i. **Hospital Putrajaya (HPJ)**
   - Dr Zanariah Hussein

ii. **Hospital Pulau Pinang (HPP)**
   - Professor Amir Sharifuddin Khir
   - Associate Professor Malik Mumtaz
   - Dr Norazizah Aziz

iii. **University Malaya Medical Centre (UMMC)**
   - Professor Chan Siew Pheng
   - Professor Ikram Shah Ismail
   - Professor Rokiah Pendek
   - Dr Shireene Vethakkan

iv. **Hospital Universiti Kebangsaan Malaysia (HUKM)**
   - Professor Norazmi Kamaruddin
   - Associate Professor Norlaila Mustafa

v. **Hospital Universiti Sains Malaysia (HUSM)**
   - Professor Dato' Mustafa Embong
   - Prof essor Dato' Mafauzy Mohamad
   - Prof essor Dato' Wan Mohamad Wan Bebakar

vi. **Hospital Umum Kuching**
   - Dr Florence Tan (for the 1st year of Fellowship program)

Trainees will undergo rotation between training centres as will be decided by the Endocrinology Fellowship Committee at the start of the Fellowship Programme. For overseas centres, training will be reviewed on a case-to case basis. The training can be recognized in part or in total if it is found to be equivalent to the local training programme.

6. CURICULLUM
The training curriculum will include the following categories (details in table form)

Clinical Curriculum
Diabetes
Endocrinology
Adrenal disorders
Nutrition and Obesity
Bone and Mineral Disorders
Hypothalamic – Pituitary Disorders
Lipid Metabolism Disorders
Thyroid disorders
Gonadal Disorders

Adrenal Disorders	Method of Education					Method of Evaluation		
	Direct Clinical Experiences		Clinical Case Discussions		Self-directed learning	Direct observations with patients	Discussions with faculty	Clinical presentations
	Inpatient	Outpatient	Attend Rds	Conference				
1. Cushings syndrome								
a) Adrenal	X	X		X	X	X	X	X
b) Pituitary	X	X		X	X	X	X	X
c) Ectopic	X	X		X	X	X	X	X
d) Iatrogenic	X	X		X	X	X	X	X
2. Adrenal Insufficiency								
a) Primary (incl polyglandular)	X	X		X	X	X	X	X
b) Secondary	X	X		X	X	X	X	X
c) Adrenal crisis	X	X		X	X	X	X	X
d) Glucocorticoid therapy	X	X		X	X	X	X	X
3. Pheochromocytoma	X	X		X	X	X	X	X
4. Mineralocorticoid Excess								
a) Aldosteronism	X	X	X	X	X	X	X	X
5. Nonfunctioning Adrenal Mass (Including Incidentaloma)								
a) Benign	X	X	X	X	X	X	X	X
b) malignant	X	X		X	X	X	X	X
6. Hirsutism and Virilization	X	X		X	X	X	X	X
7. Congenital adrenal hyperplasia	X	X		X	X	X	X	X
8. Fluid and electrolytes								
a) Hypernatremia and hyponatremia	X	X		X	X	X	X	X
b) Hypokalemia and Hyperkalemia	X	X		X	X	X	X	X
c) Metabolic acidosis and alkalosis	X	X		X	X	X	X	X
9. Hypertension								
a) Primary (Essential)	X	X		X	X	X	X	X
b) Secondary (Endocrine)	X	X		X	X	X	X	X

Tables adapted from the University of Minnesota Endocrine Fellowship Training Program

Bone and Mineral Disorders	Method of Education					Method of Evaluation		
	Direct Clinical Experiences		Clinical Case Discussions		Self-directed learning	Direct observations with patients	Discussions With faculty	Clinical presentations
	Inpatient	Outpatient	Attend Rds	Conference				
1. Biology of Bone					X		X	X
2. Physiology of Ca, Mg, P homeostasis				X	X		X	X
3. Molecular biology, biochemistry & mechanism of action - calcitropic hormones					X	X	X	X
4. Clinical Evaluation of Bone and Mineral Disorders								
a) Comprehensive, relevant history	X	X		X	X	X	X	X
b) Physical examination	X	X		X	X	X	X	X
5. Lab Methods/ Understanding assays for:								
a) Ca, P and Mg	X	X	X	X	X	X	X	X
b) Ionized calcium	X	X	X	X	X	X	X	X
c) PTH	X	X	X	X	X	X	X	X
d) Calcitonin	X	X	X	X	X	X	X	X
e) PTH-rP	X	X	X	X	X	X	X	X
f) Vitamin D metabolites	X	X	X	X	X	X	X	X
g) Urinary calcium	X	X	X	X	X	X	X	X
h) Biochemical markers for bone turnover	X	X	X	X	X	X	X	X
6. Imaging techniques/ other procedures	X	X	X	X	X	X	X	X
7. Postmenopausal & Age-related Osteoporosis		X		X	X	X	X	X
8. Other Forms of Osteoporosis								
a) Juvenille osteoporosis		X	X	X	X	X	X	X
b) Idiopathic (male and female) osteoporosis	X	X	X	X	X	X	X	X
c) Glucocorticoid osteoporosis	X	X	X	X	X	X	X	X
d) Transplant related osteoporosis	X	X	X	X	X	X	X	X
e) Other forms of secondary of osteoporosis		X	X	X	X	X	X	X

Tables adapted from the University of Minnesota Endocrine Fellowship Training Program Manual and Curriculum

Bone and Mineral Disorders	Method of Education					Method of Evaluation		
	Direct Clinical Experiences		Clinical Case Discussions		Self-directed learning	Direct observations with patients	Discussions With faculty	Clinical presentations
	Inpatient	Outpatient	Attend Rds	Conference				
9. Rickets and Osteomalacia								
a) Nutritional rickets and osteomalacia		X		X	X	X	X	X
b) Bone disease secondary to GI/liver d/o		X		X	X	X	X	X
c) Vitamin D dependent rickets		X		X	X	X	X	X
d) Hypophosphatemic rickets		X		X	X	X	X	X
e) Tumor induced osteomalacia		X		X	X	X	X	X
f) Hypophosphatasia		X		X	X	X	X	X
g) Fanconi syndrome and RTA		X		X	X	X	X	X
h) Drug induced osteomalacia	X	X		X	X	X	X	X
10. Hypocalcemic disorders								
a) Hypoparathyroidism								
b) Parathyroid resistance								
11. Renal Osteodystrophy								
12. Paget's Disease								
13. Hypercalcemic disorders								
a) Primary hyperparathyroidism								
b) Familial hpt syndromes/ MEN								
c) Familial hypocalciuric hypercalcemia								
d) Hypercalcemia of Malignancy								
e) Hypercalcemia due to granulomatous d/o								
f) Other, misc casues of hypercalcemia								
14. Other mineral abnormalities								
a) Magnesium depletion and hypermagnesemia								
b) Hyper- and hypophosphatemia								
15. Nephrolithiasis								

Adapted from the University of Minnesota Endocrine Fellowship Training Program manual and Curriculum

DIABETES	Method of Education					Method of Evaluation		
	Direct Clinical Experiences		Clinical Case Discussions		Self-directed learning	Direct observations with patients	Discussions With faculty	Clinical presentations
	Inpatient	Outpatient	Attend Rds	Conference				
1. General								
a) Patient monitoring		X	X	X	X	X	X	X
b) Treatment objectives in adults		X	X	X	X	X	X	X
c) Objectives in adolescents		X	X	X	X	X	X	X
2. Acute and chronic complications								
a) Ketoacidosis	X		X	X	X	X	X	X
b) Hyperosmolar non-ketotic coma	X		X	X	X	X	X	X
c) Hypoglycemia	X	X	X	X	X	X	X	X
d) Retinopathy		X	X	X	X	X	X	X
e) Nephropathy		X	X	X	X	X	X	X
f) Neuropathy – peripheral , autonomic		X	X	X	X	X	X	X
g) Dermatologic		X	X	X	X	X	X	X
h) Macrovascular d/o - CHD , PVD , CVD	X	X	X	X	X	X	X	X
3. Gestational diabetes mellitus								
a) Screening	X	X	X	X	X	X	X	X
b) Treatment	X	X	X	X	X	X	X	X
4. Surgical management								
a) Pre-operative preparation	X		X	X	X	X	X	X
b) Post-operative preparation	X		X	X	X	X	X	X
5. Patient education								
a) Home glucose monitoring	X	X	X	X	X	X	X	X
b) Psychosocial issues	X	X	X	X	X	X	X	X
c) Genetics and counseling	X	X	X	X	X	X	X	X
d) Nutrition	X	X	X	X	X	X	X	X
e) Hypoglycemia	X	X	X	X	X	X	X	X
f) Exercise	X	X	X	X	X	X	X	X
g) Foot care	X	X	X	X	X	X	X	X
6. Therapy								
a) Oral agents	X	X	X	X	X	X	X	X
b) Subcutaneous insulin	X	X	X	X	X	X	X	X
c) Insulin Pump	X	X	X	X	X	X	X	X
d) Intravenous Insulin and DKA	X	X	X	X	X	X	X	X

Gonadal Disorders	Method of Education					Method of Evaluation		
	Direct Clinical Experiences		Clinical Case Discussions		Self-directed learning	Direct observations with patients	Discussions With faculty	Clinical presentations
	Inpatient	Outpatient	Attend Rds	Conference				
1. Female								
a) Normal female reproductive physiology	X	X	X	X	X	X	X	X
b) Primary/ secondary amenorrhea	X	X	X	X	X	X	X	X
c) Dysfunctional uterine bleeding	X	X	X	X	X	X	X	X
d) Hirsutism/ virilization	X	X	X	X	X	X	X	X
e) Polycystic ovarian syndrome	X	X	X	X	X	X	X	X
f) Infertility	X	X	X	X	X	X	X	X
g) Menopause	X	X	X	X	X	X	X	X
2. Male								
a) Normal male reproductive physiology		X	X			X	X	X
b) Hypogonadism	X	X	X			X	X	X
c) Gynecomastia	X	X	X			X	X	X
d) Erectile dysfunction		X	X			X	X	X
e) Infertility		X	X			X	X	X
f) Prostatic disorders	X	X	X			X	X	X
3. Pediatric								
a) Intersex disorders		X					X	X
b) Precocious puberty		X					X	X
c) Delayed puberty		X					X	X
d) Gonadal dysgenesis		X					X	X
4. Neoplasia								
a) Testicular tumors	X						X	X
b) Ovarian tumors	X						X	X
5. Disease Specific Studies/ Procedures								
a) GnRH/ GnRH analogues		X	X			X	X	X
b) Ovarian ultrasound		X	X				X	X
c) Pelvic examination		X	X			X	X	X
d) Semen analysis		X	X				X	X
e) Induction of spermatogenesis		X	X				X	X
f) Male/Female hormonereplacement		X	X			X	X	X
g) Ovulation induction (suggestion)			X				X	X

Hypothalamic and Pituitary Disorders	Method of Education					Method of Evaluation		
	Direct Clinical Experiences		Clinical Case Discussions		Self-directed learning	Direct observations with patients	Discussions With faculty	Clinical presentations
	Inpatient	Outpatient	Attend Rds	Conference				
1. Pituitary Tumors								
a) Cushing's Disease	X	X		X	X	X	X	X
b) Acromegaly	X	X		X	X	X	X	X
c) Prolactinoma	X	X		X	X	X	X	X
d) Non-functioning adenomas	X	X		X	X	X	X	X
2. Space-Occupying/ Infiltrative Dis								
a) Craniphargyloma	X	X		X	X	X	X	X
b) Hemochromatosis	X	X		X	X	X	X	X
c) Histiocytosis X	X	X		X	X	X	X	X
d) Sacroid	X	X		X	X	X	X	X
3. Hypopituitarism								
a) Adrenal	X	X		X	X	X	X	X
b) Thyroid	X	X		X	X	X	X	X
c) Growth hormone	X	X		X	X	X	X	X
d) Gonadotropins		X		X	X	X	X	X
4. Water Balance								
a) Diabetes insipidus	X	X		X	X	X	X	X
b) SIADH	X	X		X	X	X	X	X
5. Disease Specific Studies/ Prodecures								
a) GnRH stimulation		X		X	X	X	X	X
b) Insulin induced hypoglycemia	X	X	X	X	X	X	X	X
c) CRH stimulation		X		X	X	X	X	X
d) IPSS	X	X	X	X	X	X	X	X
e) Pituitary imaging MRI/CT	X	X	X	X	X	X	X	X
f) Dexamethasone supression		X		X	X	X	X	X

Lipid disorders, Nutrition and Obesity	Method of Education					Method of Evaluation		
	Direct Clinical Experiences		Clinical Case Discussions		Self directed Learning	Clinical Case Discussions	Direct Clinical Experiences	Clinical Case Discussions
	Inpatient	Outpatient	Attend Rounds	Conference				
1.Cholesterol								
a) LDL defect		X	X	X	X	X	X	X
b) LDL receptor defect		X	X	X	X	X		X
c) Management		X	X	X	X	X	X	X
2. Triglycerides								
a) Chylomicrom		X	X	X	X	X	X	X
b) Lipoprotein lipase defect		X	X	X	X	X	X	X
c) Apoprotein CII defeciency			X	X	X	X		X
d) VLDL		X	X	X	X	X	X	X
e) Management		X	X	X	X	X	X	X
3. Mixed defects								
a) Management		X	X	X	X	X	X	X
4. Secondary Dyslipidemias								
a) Diabetes mellitus		X	X	X	X	X	X	X
b) Hypothyroidism		X	X	X	X	X	X	X
c) Medication		X	X	X	X	X	X	X
5. Others Lipid abnormalities								
a) Lp(a)		X		X	X	X	X	X
b) Apoprotein physiology		X		X	X	X	X	X
6. Obesity								
a) Pathophysiology		X		X	X	X	X	X
b) Diagnosis		X		X	X	X	X	X
c) Management		X		X	X	X	X	X
7. Starvation								
a) Anorexia nervosa	X	X		X	X	X	X	X
b) Bulemia	X	X		X	X	X	X	X
8. Vitamin Deficiency								
a) Water soluble	X			X	X	X	X	X
b) Fat soluble	X	X		X	X	X	X	X

Thyroid Disorders	Method of Education					Method of Evaluation		
	Direct Clinical Experiences		Clinical Case Discussions		Self-directed learning	Direct observations with patients	Discussions with faculty	Clinical Presentations
	Inpatient	Outpatient	Attend Rds	Conference				
1. Hyperthyroidism								
a) Grave's Disease	X	X	X	X	X	X	X	X
b) Thyroiditis	X	X	X	X	X	X	X	X
c) Toxic nodule	X	X	X	X	X	X	X	X
d) Toxic multinodular goiter	X	X	X	X	X	X	X	X
e) Struma Ovaril			X	X	X	X	X	X
f) Thyrotoxicosis factitia	X	X	X	X	X	X	X	X
g) Other	X	X	X	X	X	X	X	X
2. Hypothyroidism								
a) Thyroiditis		X	X	X	X	X	X	X
b) Post-ablative		X	X	X	X	X	X	X
c) Other		X	X	X	X	X	X	X
3. Thyroid Cancer								
a) Papillary thyroid cancer	X	X	X	X	X	X	X	X
b) Follicular thyroid cancer	X	X	X	X	X	X	X	X
c) Medullary thyroid cancer	X	X	X	X	X	X	X	X
d) Anaplastic thyroid cancer	X	X	X	X	X	X	X	X
e) Other	X	X	X	X	X	X	X	X
4. Goitres								
a) Single nodule	X	X	X	X	X	X	X	X
b) Multinodular goiter	X	X	X	X	X	X	X	X
c) Diffuse goiter	X	X	X	X	X	X	X	X
d) Other	X	X	X	X	X	X	X	X
5. Other								
a) Polyglandular autoimmune syndrome	X	X	X	X	X	X	X	X
b) Pregnancy-related thyroid dis	X	X	X	X	X	X	X	X
c) Non-thyroidal illness	X	X	X	X	X	X	X	X
6. Disease Specific Studies/Procedures								
a) Fine needle aspiration		X	X	X	X	X	X	X
b) Thyroid ultrasound		X	X	X	X	X	X	X
c) Thyroid scan-iodine	X	X	X	X	X	X	X	X
d) Thyroid scan-Technetium	X	X	X	X	X	X	X	X

Curriculum for Laboratory experience

Exposure to the laboratory environment either a chemical pathology or an endocrine laboratory capable of doing the full range of hormonal assays and HbA1c/fructosamine measurement is essential.

The trainee must understand

i. basic laboratory management such as basic concepts in good laboratory practices – equipment maintenance, quality controls etc.
ii. basic principles of immunoassay and pitfalls, and the process of methodology evaluation.

An introduction to basic molecular tool and techniques would be very useful to student who wishes to specialize in molecular endocrinology.

A short stint in an accredited laboratory especially with hands on experience in doing some of the immunoassays would be useful. Laboratory-based research can be incorporated in the 3 years of training.

Log Book - LABORATORY

DATE	NAME OF LAB TEST	SCOPE OF TRAINING UNDERTAKEN

7. PROGRESSIVE ASSESSMENT

7.1 Training must be supervised by officially appointed trainers / supervisors at the designated training centres as will be decided by the Endocrinology Fellowship Committee at the start of the Fellowship Programme.

7.2 Assessment of trainees will be based on:

i. Clinical skills – includes medical record keeping, clinical judgement, decision making and organizational ability.

ii. Technical skills – judgement, understanding and proficiency in performing certain procedures including understanding indications, contraindications, complications and the ability to interpret their results

iii. Attitude – demonstration of appropriate professional attitude, behavior and interpersonal skills

iv. Educational activities – trainees are expected to attend courses, seminars, lectures and other CME activities in the specialty throughout the training period

v. Research – Trainees should be involved in at least one research project which should be presented / published in local / overseas journal

vi. Teaching – Trainee must be involved in teaching of junior doctors and paramedical staff

vii. Log book statistics

viii. Case write-ups - at least 2 write – ups per year of “case report publishable standards and one submitted at the end of every 6 months in duplicate / two copies to supervisors / trainers for Assessment by 2 reviewers.

7.3 Assessment of trainees will be done regularly during the training period. At the end of each 12 monthly rotation, there should be a formal meeting between trainees and supervisors / trainers to review log books and to provide feedback information to the candidate.

7.4 The learning experience of a trainee should be properly recorded in the **log book** which should provide information on:

i. Cases and statistics – outpatient / inpatient which have been managemd and followed through with details on highlights and learning points of each case, related literature references.

ii. Procedures / endocrine dynamic testing and statistics – should demonstrate procedures observed / done with supervision and done independently.

iii. Educational activities

iv. Research Activities

v. Publications

vi. Presentation at meetings

vii. Attendences at courses, seminars, workshops

The log book records should demonstrate increasing exposure and experience of the trainee throughout the training period.

8. EXIT EVALUATION

8.1 On satisfactory completion of the training period, the trainee will be assessed by an invited Board of Examiners determined by the Fellowship Committee.

8.2 Exit evaluation will include:

i. Review of log book and supervisor / trainer assessment reports
ii. Viva voce
iii. Research Project Presentation

9. CERTIFICATION OF COMPLETION OF TRAINING

9.1 A Certificate of Completion of Subspecialty Training will be awarded to the trainee following completion of the required training period and exit evaluation. This Certificate will be awarded by the Professional Development Division of the Ministry of Health, Malaysia

10. GAZETTEMENT AND CREDENTIALLING

Following completion of training, application for gazettement as an Endocrinologist in the Ministry of Health can be made through the Professional Development Division of the Ministry of Health. In addition, applications for credentialing as an Endocrinologist can also be submitted to the Academy of Medicine for evaluation by the Endocrinology Credentialling Subcommittee. Successful applicants will be listed accordingly on the National Specialist Register.

Prepared by
Endocrine Fellowship Training Committee
Ministry of Health
21 March 2008

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Secretary
Dr Norazizah Aziz, Hospital Pulau Pinang

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