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CURRICULUM

FELLOWSHIP TRAINING PROGRAM

ENDOCRINOLOGY, DIABETES & METABOLISM

AT

THE UNIVERSITY OF ALABAMA AT BIRMINGHAM SCHOOL OF MEDICINE

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UAB MEDICAL CENTER
ENDOCRINOLOGY, DIABETES & METABOLISM TRAINING PROGRAM
CURRICULUM

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Overview:

Training in Endocrinology and Metabolism is designed to allow residents to acquire expertise as a consultant in the subspecialty. To achieve this goal, the educational activities of the program include outpatient and inpatient care, didactic case reviews in pathophysiology, research experience and conferences, participation in literature review conferences, experience with thyroid biopsy, and teaching responsibilities of internal medicine residents. All activities in the program are under the supervision of attending faculty and the Program Director.

The curriculum of the endocrinology training program revolves around three major areas:

- A. Didactic lectures
- B. Clinical experience
- C. Research experience

Program Content

The following is a summarized list of the most common disorders that will be taught and reviewed during the two years of fellowship training in Endocrinology, Diabetes & Metabolism at UAB through the three major training areas described above. This list is excerpted from the ACGME.

- A. Thyroid disorders, including
 - a. hyperthyroidism and hypothyroidism
 - b. nodular thyroid diseases
 - c. thyroid cancer
 - d. goiter
 - e. thyroiditis, including chronic, silent, subacute, and autoimmune
- B. Hypothalamic and pituitary tumors, including
 - a. pituitary tumors of all types, with particular experience in the diagnosis and management of prolactinoma, acromegaly, Cushing's disease, and clinically non-functioning tumors

- b. craniopharyngeoma and other space occupying and infiltrative disorders of the pituitary and hypothalamic region
 - c. hypopituitarism
 - d. growth hormone disorders
 - e. hypothalamic insufficiency
 - f. SIADH
 - g. diabetes insipidus (primary and nephrogenic)
 - h. galactorrhea
- C. Type 1 and Type 2 diabetes mellitus, including
- a. patient monitoring and treatment objectives in adolescents and adults
 - b. acute and chronic complications, including
 - i. diabetic ketoacidosis
 - ii. hyperosmolar non-ketotic syndromes
 - iii. hypoglycemia
 - iv. microvascular and macrovascular disease including
 - v. diabetic retinopathy
 - vi. diabetic nephropathy
 - vii. diabetic neuropathy
 - viii. dermatologic aspects of diabetes
 - ix. coronary heart disease
 - x. peripheral vascular disease
 - xi. cerebral vascular disease
 - xii. infections in the diabetic patient
 - c. gestational diabetes mellitus
 - d. diabetes mellitus in the pregnant patient
 - e. the surgical patient with diabetes mellitus
 - f. patient education
 - g. psychosocial issues
 - h. genetics and genetic counseling as it relates to patients with endocrine and metabolism disorders
 - i. dietary principles
- D. Hypoglycemic syndromes, including the spectrum of insulinoma and other causes
- E. The diagnosis and management of lipid and lipoprotein disorders
- F. The diagnosis and management of primary and secondary hypertension
- G. Disorders of bone and mineral metabolism, including
- a. hyperparathyroidism and other causes of hypercalcemia
 - b. hypoparathyroidism and other causes of hypocalcemia
 - c. metabolic bone diseases, with particular emphasis on the diagnosis and management of osteoporosis
 - d. evaluation and prevention of kidney stones
 - e. Paget's disease
 - f. osteomalacia and disorders of vitamin D and phosphorus metabolism
 - g. disorders of magnesium metabolism

- H. Disorders of the adrenal cortex and medulla including:
 - a. benign and malignant adrenal tumors
 - b. adrenogenital syndromes
 - c. Cushing's syndrome, including drug-induced
 - d. adrenal cortex hypofunction- cause and therapy.
 - e. pheochromocytoma
 - f. primary aldosteronism
- I. Disorders of fluid, electrolyte, and acid-base metabolism, including
 - a. hypernatremia and hyponatremia
 - b. hyperkalemia and hypokalemia
 - c. metabolic acidosis
 - d. metabolic alkalosis
- J. Disorders of magnesium and phosphorous metabolism
- K. Endocrine aspects of psychiatric diseases
- L. Endocrine aspects of aging, with particular emphasis on the care of geriatric patients with endocrine disease and diabetes and the endocrine changes associated with aging
- M. Autoimmune polyglandular failure syndrome
- N. Endocrine emergencies, including
 - a. hypercalcemia and hypocalcemia
 - b. severe hypo- and hyperthyroidism
 - c. adrenal insufficiency
 - d. pituitary apoplexy
- O. Parenteral nutritional support
- P. Nutritional disorders
 - a. obesity - pathophysiology, diagnosis and management
 - b. anorexia nervosa and bulimia
- Q. Hormone-producing neoplasms, particularly carcinoid syndromes, ectopic hormone production, islet cell tumors and multiple endocrine neoplasia syndromes
- R. Female and male reproduction, including
 - a. primary and secondary amenorrhea
 - b. hirsutism/virilization
 - c. dysfunctional uterine bleeding
 - d. infertility
 - e. menopause
 - f. testicular tumors
 - g. erectile dysfunction
 - h. gynecomastia
 - i. hypogonadism
- S. Endocrine adaptations and maladaptations to systemic diseases, including effects on the thyroidal, adrenal, and gonadal axes.
- T. Technical and Other Skills Residents should have experience in the performance of endocrine clinical laboratory and radionuclide studies and basic laboratory techniques, including quality control, quality assurance, and proficiency standards. Provision must be made for the residents to

- acquire experience and skill in the following areas:
- a. The interpretation of laboratory tests; immunoassays; and radionuclide, ultrasound, radiologic, and other imaging studies for the diagnosis and treatment of endocrine and metabolic disease,
 - b. The effects of a variety of non-endocrine disorders on laboratory and imaging studies and performance and interpretation of stimulation and suppression tests.
 - c. Performance and cytologic interpretation of fine needle aspiration of the thyroid.
 - d. Indication and interpretation of quantitative digital radiography and other tests used in the management of osteoporosis and other metabolic bone diseases.
- U. Management of adolescent and adult patients of all ages with diabetes mellitus, including but not limited to the following aspects of the disease:
- a. The utilization and interpretation of autoimmune markers of Type 1 diabetes in patient management and counseling
 - b. Prescription of exercise programs
 - c. Rationale for and calculation of diabetic diets
 - d. Oral antidiabetic therapy
 - e. The use of intravenous insulin in acute decompensated diabetes mellitus
 - f. Chronic insulin administration, including the use of all varieties of insulin delivery systems
 - g. Glucose monitoring devices
 - h. Funduscopic examination, recognition, and appropriate referral of patients with diabetic retinopathy
 - i. Foot care
 - j. Psychosocial effects of diabetes mellitus on patients and their families
 - k. Patient and community education
- V. Formal Instruction The formal curriculum of the program also provides with instruction in the following:
- a. Pathogenesis and epidemiology of diabetes mellitus
 - b. Genetics as it relates to endocrine diseases
 - c. Developmental endocrinology, including growth and development, sexual differentiation, and pubertal maturation
 - d. Endocrine physiology and pathophysiology in systemic diseases and principles of hormone action
 - e. Biochemistry and physiology, including cell and molecular biology and immunology, as they relate to endocrinology and metabolism
 - f. Signal transduction pathways and biology of hormone receptors

**EDUCATIONAL GOALS AND OBJECTIVES
FOR SUBSPECIALTY RESIDENTS (FELLOWS) TRAINING IN ENDOCRINOLOGY
DIABETES & METABOLISM AT THE UNIVERSITY OF ALABAMA AT
BIRMINGHAM (UAB) MEDICAL CENTER**

Overall Goals & Objectives:

1. To learn the necessary clinical and technical skills, in a progressive fashion, that is expected from a subspecialist in endocrinology. The necessary skills required for a fellow in endocrinology to attain by completion of training are outlined in the attached curriculum.
2. To accumulate a critical mass of fundamental information in the subspecialty of endocrinology, and practical approaches to most endocrine problems.
3. To learn about resources available in order to acquire continuing education and patient care appropriate to the subspecialty of endocrinology.
4. To learn skills necessary to provide cost effective, ethical, and humanistic care of patients with endocrine diseases. The humanistic approaches to medicine are provided in mentored and didactic interactions with the faculty.
5. To learn how to communicate clinical recommendations effectively to patients, referring physicians, and other peers.
6. To learn principles for performance and evaluation of clinical and basic research in order to facilitate the accumulation of knowledge to enhance patient care and comprehend new research innovations in the subspecialty of endocrinology.
7. To learn to present clinical and research material in written and oral form to enhance communication with colleagues.

Description of individual training components and rotations, and the individual goals and objectives for each major area of training:

A. Didactic Lectures:

1) Basic Science Seminars in Signal Transduction:

Goals and Objectives:

In this lecture series a wide variety of research topics relevant to the mechanism of endocrine disease are presented. The work is usually presented in an informal manner by trainees in the laboratories at this medical center. Approximately ten laboratories participate in this seminar series. If the subspecialty resident is involved in basic laboratory research, he/she is required to attend this series and present his/her data to the group for critique and evaluation in a constructive manner. Biochemistry and physiology including cell and molecular biology as they relate to endocrinology, diabetes, and metabolism are discussed. The appropriate utilization and interpretation of basic molecular and cellular laboratory techniques are stressed. This seminar series is held every two weeks. The formal curriculum of the program must as a minimum provide instruction in the following: Biochemistry and physiology, including cell and molecular biology and immunology, as they relate to endocrinology and metabolism and Signal transduction pathways and biology of hormone receptors and principles of hormone action.

Method of Evaluation:

Feedback is immediate to the speaker. This feedback is provided in the form of constructive criticism and suggestions for improvement of the work.

2) Endocrinology Grand Rounds Lecture Series:

Goals and Objectives:

In this lecture series, a wide variety of clinical topics relevant to the endocrinology, diabetes and metabolism are presented. These lectures are presented usually by invited experts from other centers in the US, or by UAB faculty - both from the division and other departments - whose interests relate to endocrinology, diabetes and metabolism. The subspecialty resident (fellow) is expected to present four to six such lectures in each of the study years. If the subspecialty resident has accomplished a research objective, the research topic is presented in a formal manner near the end of the second year of study.

The subjects are broadly based to cover all of the important areas of the subspecialty of endocrinology, diabetes and metabolism. These areas include

disorders of all endocrine glands, including the parathyroids, pituitary, thyroid, pancreas, adrenal, and gonads, growth factors and endocrine function of brain, kidney, skin and other non-endocrine tissues are discussed. Both the clinical and basic science aspects are discussed in depth. This lecture series is a formal series that is attended by faculty, housestaff from the department of medicine, and the subspecialty residents (fellows). This weekly series provides CME credits. The formal curriculum of the program must as a minimum provide instruction in the following: Pathogenesis and epidemiology of diabetes mellitus, Genetics as it relates to endocrine diseases, Pediatric endocrinology, Reproductive endocrinology, Endocrine physiology and pathophysiology in systemic diseases.

Method of evaluation:

The subspecialty resident is provided immediate feedback by the program director as to the quality of the lecture provided. The evaluation of the lecture becomes part of the overall evaluation of the resident. This lecture also provides for attendees an opportunity to accrue CME credits.

3) *Best Case of the Week Conference Series*

Goals and Objectives:

The purpose of this series is to provide an opportunity to informally discuss challenging, controversial or fascinating clinical cases encountered during the course of the week in the outpatient clinics or the hospitals. The meetings are attended by the faculty and subspecialty residents. Faculty includes not only members of the endocrine division, but also representatives from the Department of Surgery (Surgical Oncology and ENT), Pediatrics (Pediatric Endocrinology), Pathology (Clinical Pathology), and Radiology (Nuclear Medicine), and frequently as well, practicing and retired endocrinologists from the surrounding community. Presentations are provided by all attendees and include an account of the history, physical exam and laboratory and imaging data. An open discussion is held concerning problems with diagnosis or therapy for the case under discussion. The faculty and fellows are provided with differing views on these cases and thereby develop a broadened perspective on the nature of clinical endocrinology. This series provides a means of evaluating the thought processes of all participants. It also helps in the development of consensus on the approaches to difficult endocrine conditions.

Method of evaluation:

The subspecialty resident is provided immediate feedback by the faculty and other resident on the appropriateness of the diagnosis or therapy plan. The evaluation of the presentation becomes part of the overall evaluation of the resident. This series also provides for attendees an opportunity to accrue CME credits.

4) Journal Club:

Goals and Objectives:

The purpose of the journal club is to provide endocrinology residents and research fellows with a means of keeping up with the most recent developments in both the clinical and basic science aspects of Endocrinology. In addition critical appraisal of the design, methodology, assays, and statistical analysis utilized in the presented paper is stressed. Journal clubs are held once every month. The trainees take turns in preparing articles for presentation.

Method of Evaluation:

Feedback is given to resident and fellows presenter's about the style and content of their presentation by their mentor or by members of the division of endocrinology.

5) General Clinical Research Lectures

Goals and Objectives:

The Research Committee of the Department of Medicine organizes a yearly didactic lecture series designed to teach general research approaches to all subspecialty residents (fellows). These series have covered general techniques in molecular biology, epidemiology and clinical research methodology and statistics. This series is designed to provide knowledge of research techniques that apply to all areas of medicine. The series are provided by faculty from the medical center and are directed at all UAB subspecialty residents.

Method of Evaluation:

The lectures are evaluated by the residents on formal evaluation forms. The residents are not formally tested on the topics presented.

B. Clinical Experience:

The subspecialty resident participates in multiple, highly supervised (mentored) clinical education experiences on focused endocrine problems. These occur in the UAB Medical Center (UAB Hospital and Kirklin Clinic), Birmingham VA Medical Center (Hospital & Clinic), and the Children's Hospital of Alabama. In addition, the above mentioned multiple interactive and didactic conferences focus on clinical issues that complement the clinical exposure.

The individual Goals and Objectives and means evaluation are stated below for the various experiences.

1. Inpatient Endocrine Consult Service:

Goals and Objectives:

To learn skills related to inpatient consultations on a broad range of endocrine metabolic disorders. The subspecialty resident has regularly scheduled intensive consultation service experience in addition to informal attachment to the consult service. The service is led by a faculty member and includes both housestaff and a nurse practitioner/diabetes educator. This experience allows the subspecialty resident to encounter patients with a wide variety of endocrine disorder and to organize and teach the housestaff about the hospital management of these endocrine conditions. In addition, the cases are each discussed in depth by the attending faculty member who also provides didactic lectures to both the housestaff and subspecialty residents on topics in clinical endocrinology.

This experience specifically stresses those aspects that are most encountered in the inpatient setting such as:

Endocrine emergencies, including

- a. Ketoacidosis
- b. Hypercalcemia and hypocalcemia
- c. Thyroid storm
- d. Myxedema coma
- e. Adrenal insufficiency
- f. Pituitary apoplexy

Disorders of fluid, electrolyte and acid-base metabolism, including

- a. Hyponatremia and hypernatremia
- b. Hypokalemia and hyperkalemia
- c. Metabolic acidosis
- d. Metabolic alkalosis
- e. Diabetes insipidus, central and nephrogenic

In hospital management of diabetes mellitus.

Diabetic foot ulcers and other diabetes complications.

Perioperative management of diabetes mellitus.

Hormone-producing neoplasms.

Endocrine adaptations and maladaptations to systemic diseases.

Differential diagnosis and management of disorder's of primary and secondary hypertension.

Neuroendocrinology and endocrine aspects of psychiatric diseases.

The interpretation of laboratory tests; immunoassays; and radionuclide, ultrasound radiologic and other imaging studies for the diagnosis and treatment of endocrine and metabolic disease, including the effects of a variety of unrelated disorders and performance and interpretation of stimulation and suppression tests.

Communication, both written and spoken, with referring physicians and other members of the health community.

Upon completion of their training, fellows will be experienced in the inpatient and consultative care of patients who present with endocrinologic diseases, including, but not limited to, diabetic ketoacidosis, hyperosmolar syndromes, complications of diabetes mellitus, hyper- and hyponatremia, thyroid storm, myxedema, adrenal insufficiency, malignant hypertension, pituitary apoplexy and diabetes insipidus.

Teaching Methodology:

This consists of direct patient interaction with hospitalized patients referred by primary care providers to the endocrinology consult service. All patients are presented either on formal teaching rounds (5 days/week) or directly to the full time attending on a more urgent basis (24 hrs on call faculty responsibility). Faculty review of history, physical findings, assessment, and plan are performed on every patient. The faculty discusses each patient from an individual and disorder specific basis. Relevant literature and faculty experience are reviewed. Subspecialty residents are expected to review relevant literature before and after presentation to faculty. Selected cases and topics are discussed further at the weekly Best Case Conference where subspecialty residents and faculty discuss the case example and related topics in additional detail. Exemplary cases sometimes become the topic of the more formal Endocrinology Grand Rounds Lecture Series.

Method of Evaluation:

All subspecialty fellows assigned to the inpatient service are evaluated quarterly by the faculty serving as mentors during this period. The faculty members are also evaluated at least semiannually by subspecialty residents.

2. Fellows' Continuity Clinic:

Goals and Objectives:

To learn skills related to history taking, examination, assessment and planning for the ambulatory patients with various endocrine conditions, but mostly diabetes and its various presentations as referred to the subspecialty endocrine/diabetes clinic. Patients seen in this venue include difficult to manage Type I and Type 11 diabetes mellitus patients and newly diagnosed patients. Through interaction with the staff available in this clinic (endocrinology, diabetes teaching nurses, dieticians and podiatrists), the subspecialty resident is exposed to the multidisciplinary management of the disease. One half-day clinic at The Kirklin Clinic (TKC) is provided each week in which the fellow develops his/her own practice thereby becoming involved in the longitudinal care of his/her own set of patients. The following topics are emphasized:

- Patient monitoring and treatment objectives for adults with diabetes

- The rationale, indications, performance and interpretation of glucose tolerance tests
- The utilization and interpretation of glycosylated hemoglobin levels, islet cell and insulin antibody levels in patient management and counseling.
- Rational for and calculation of diabetic diets.
- Prescription of exercise programs.
- Oral antidiabetic therapy.
- The use of intravenous insulin in acute decompensated diabetes mellitus.
- Chronic insulin administration including the use of all varieties of insulin delivery systems.
- Glucose monitoring devices.
- Fundoscopic examination, recognition, and appropriate referral of patients with diabetic retinopathy.
- Foot care.
- Psychosocial effects of diabetes mellitus on patients and their families.
- Patient and community education
- Acute and chronic complications, including
 - i. Diabetic ketoacidosis.
 - ii. Hyperosmolar coma.
 - iii. Hypoglycemia.
 - iv. Microvascular and macrovascular disease, including
 - v. Diabetic retinopathy.
 - vi. Diabetic nephropathy.
 - vii. Diabetic neuropathy.
 - viii. Diabetic dermopathy.
 - ix. Coronary heart disease.
 - x. Peripheral vascular disease.
 - xi. Cerebral vascular disease.

Conditions also seen in this general endocrine/diabetes clinic include the following. Specialized clinics (see below) put even more emphasis on some of these conditions.

- Thyroid disorders, including:
 - i. Hyperthyroidism and hypothyroidism.
 - ii. Nodular thyroid diseases.
 - iii. Thyroid cancer.
 - iv. Goiter.
 - v. All varieties of thyroiditis, including silent, autoimmune and chronic thyroiditis.
- Disorders of calcium and skeletal metabolism, including
 - i. Hyperparathyroidism and other causes of hypercalcemia.
 - ii. Hypoparathyroidism and other causes of hypocalcemia.
 - iii. Metabolic bone diseases.
 - iv. Evaluation and treatment of kidney stones.
- Disorders of blood pressure.
- Endocrine aspects of aging, including menopause.
- Nutritional disorders and obesity.
- Male and female reproductive endocrinology.
- Routine management of patient with treated pituitary disease.

After completing this experience, trainees will have a detailed understanding of the pathogenesis, clinical presentation, diagnostic approach, and therapeutic

management of endocrine disorders. They will also have been trained in the interpretation of laboratory tests, immunoassay techniques, endocrine imaging studies (e.g., radiologic, radionuclide and ultrasound), fine needle aspiration of the thyroid, and effective communication with referring health care providers.

Teaching Methodology:

Patient-based mentored assessment of historical findings, examination, and therapeutic plan. Each patient is seen by a faculty attending. Pragmatic and theoretical issues plus practical, ethical, socioeconomic issues are discussed in this format.

Method of Evaluation:

All subspecialty residents are evaluated at least semiannually. In addition endocrinology and internal medicine residents evaluate full time and volunteer faculty and the clinic as an educational experience semiannually.

3. Pediatric Endocrinology

Goals and Objectives:

To learn skills related to history taking, examination and assessment for children with a variety of endocrine disorders. This clinic is held at the Children's Hospital of Alabama and is staffed by several full time Pediatric Endocrinologists, Nurse Practitioners, Nutritionists and Diabetes Educators. The goal is to provide comprehensive training in the care of children with a variety of endocrine disorders and diabetes. The exposure to the pediatric endocrine clinic occurs over one or two months with two or three half-day clinics per week. The following topics are emphasized:

- i. Understanding the normal physiology of growth and puberty
- ii. Diagnosis, evaluation, and treatment of precocious puberty
- iii. Evaluation and treatment of delayed puberty
- iv. Understanding how systemic diseases, nutritional factors, and endocrine abnormalities impact on growth and sexual development
- v. Interpretation of dynamic endocrine testing in the evaluation of disorders of growth and sexual development
- vi. Evaluation and treatment of short stature
- vii. Evaluation of primary and secondary amenorrhea

Upon completion of this rotation, trainees will be proficient in the management of patients with short stature, pubertal disorders, primary and secondary

amenorrhea, and disorders of sexual differentiation.

Teaching Methodology:

Patient-based mentored assessment of historical findings, examination, and therapeutic plan. Each patient is seen by a faculty attending. Pragmatic and theoretical issues plus practical, ethical, socioeconomic issues are discussed in this format.

Method of Evaluation:

All subspecialty residents are evaluated at the end of their rotation. In addition the endocrinology residents evaluate faculty and the clinic as an educational experience semiannually.

4. Pituitary Clinic

Goals and Objectives:

To learn the skills related to history taking, examination, assessment and plan for the management of ambulatory patients with symptoms suggestive of a midline tumor that might involve the pituitary gland, or the management of the patient with complicated pituitary pathology. Pituitary disease is seen in the general endocrinology clinic but the endocrine residents can join the alternate week pituitary clinic for additional experience. Subspecialty residents are familiarized with the diagnosis and management of the following hypothalamic and pituitary tumors:

- Prolactinoma
- Alpha subunit secreting pituitary tumors
- Acromegaly
- Cushing's disease
- Gonadotropin-secreting pituitary tumors
- Thyrotropin producing pituitary tumors
- Nonfunctioning tumors
- Metabolically active lesions
- Craniopharyngioma

Upon completion of this rotation, trainees will be proficient in the management of patients with functioning and nonfunctioning pituitary tumors. This will include understanding of, and competency in, the initial evaluation of patients with suspected acromegaly, Cushing's disease, hyperprolactinemia, and glycoprotein hormone (TSH, LH, FSH) hypersecretion. Trainees will be experienced in the evaluation of patients with non-pituitary sellar or suprasellar masses, such as craniopharyngiomas, hypothalamic tumors, and

granulomatous diseases. Trainees will understand the appropriate use of imaging procedures of the hypothalamus and pituitary, and of dynamic testing of hypothalamic-pituitary-end organ function. Trainees will also understand appropriate medical, surgical, and radiation therapies for these disorders.

Teaching Methodology:

This is a multidisciplinary clinic where patients are seen by both endocrine and neurosurgery faculty attendings. Patient-based mentored assessment of historical findings, examination of therapeutic plan is performed. Each patient is seen by both the endocrine and neurosurgical attending. MRIs or CT scans for the patients with pituitary abnormalities are reviewed. Pragmatic and theoretical issues along diagnostic and therapeutic strategies are discussed.

Method of Evaluation:

All subspecialty residents are evaluated at least semiannually. In addition endocrinology and internal medicine residents evaluate full time faculty and the clinic as an educational experience semiannually.

5. Nuclear Medicine

Goals and Objectives:

The nuclear medicine clinic provides one or two months of intensive training in nuclear medicine. In each of the two months, 4 or 5 half-day clinics are provided. The endocrine fellows goals and objectives are to focus primarily on the assessment and management of thyroid disease using radioisotopes, however, scanning modalities using other labeled compounds for the assessment of adrenal cortical and medullary disease, and other neuroendocrine tumors are demonstrated.

The residents and fellows are also taught by didactic lectures, the basic nuclear physics necessary for the understanding of this diagnostic and therapeutic modality. The disorders that are covered are primarily as follows:

Thyroid disease

- a) thyroid cancer (localized and metastatic)
- b) thyroid nodules and goitre
- c) Graves' disease

Adrenal disease

- a) adrenal cortical nodules and adenoma
- b) Pheochromocytoma

Neuroendocrine disorders

- a) carcinoid tumors

b) islet cell tumors

Upon completion of this rotation, fellows will be expected to understand the roles, clinical uses and limitations of nuclear imaging techniques in the evaluation of endocrine organs, with particular emphasis on thyroid studies (^{99m}Tc , ^{131}I , ^{123}I), adrenal imaging (MIBG), as well as Octreotide Scans. They will understand and be able to interpret these imaging studies, and know how to apply the results to the care of individual patients. They will also demonstrate an understanding of, and competency in, the evaluation and management of patients with thyroid cancer, pheochromocytoma, and adrenal adenoma.

Teaching Methodology:

The endocrine resident is exposed to patients that will undergo nuclear medicine procedures. The resulting scans are read by the resident in conjunction with a nuclear medicine faculty member. The scans are correlated to the clinical picture and an assessment of the pathology is made on the basis of this correlation. For thyroid cancer assessment and therapy, the residents are involved in the assessment of metastatic burden and the risk/benefits for radioisotope therapy for each type of thyroid cancer in its particular clinical setting. Several of the thyroid needle aspiration biopsies are examined by the resident in conjunction with a cytopathologist to provide an appreciation of the assessment of these samples.

Method of Evaluation:

The subspecialty residents are evaluated at the completion of the two months of training based on the performance during this rotation. In addition the endocrinology residents evaluate faculty and the clinic as an educational experience semiannually.

6. High Risk Pregnancy Clinic

Goals and Objectives:

This clinic rotation is provided by the Department of Obstetrics and Gynecology as a one month rotation with three half day clinics per week. The goal of this clinic is for the endocrine fellows to be involved in the team management of pregnant diabetics. The clinic includes faculty and residents from the Department of Obstetrics and Gynecology. The endocrine fellow participates in the evaluation and care of these patients, with particular emphasis on the optimal management of diabetes during gestation.

- Gestational diabetes mellitus and diabetes mellitus complicated by pregnancy.
- Patient education.

- Psychosocial issues.
- Genetics counseling.
- Hypoglycemic syndromes.
- Dietary principles.

Upon completion of this rotation, trainees will be proficient in the evaluation and treatment of diabetes mellitus and thyroid disease in pregnancy. This will include recognition and understanding of the effects of hyperglycemia on fetal development, and of the effects of pregnancy on glucose metabolism. They will know how to screen for diabetes mellitus during pregnancy, and how to treat women with both gestational and pregestational diabetes mellitus. They will also review the long term risk for developing diabetes mellitus in patients with gestational diabetes. Trainees will recognize the importance of excellent diabetes control prior to conception and throughout pregnancy, and will know how to optimize diet and insulin treatment in order to achieve this goal. In addition, they will understand the effects of pregnancy on diabetic complications and how to screen for and treat these changes.

Trainees will also understand the changes in thyroid hormone regulation during pregnancy and know how to evaluate suspected thyrotoxicosis and hypothyroidism before, during, and after pregnancy. They will know the risks to the fetus associated with maternal thyroid disease and the appropriate medical, surgical, and radiopharmaceutical therapies for these disorders. Trainees will also demonstrate an understanding of how pregnancy impacts on other endocrine systems and diseases, including, but not limited to, prolactinomas, water metabolism, and hypertension.

Teaching Methodology:

Patient-based mentored assessment of historical findings, examination and therapeutic plan is conducted. Each patient is seen by a faculty attending. Pragmatic and theoretical issues along with diagnostic and therapeutic strategies are discussed. Frequently ethical issues along with economic issues related to patient's compliance and ability to cope with the disease are discussed in this format.

Method of Evaluation:

The subspecialty residents are evaluated at the end of the rotation. In addition endocrinology residents evaluate the faculty and the clinic as an educational experience.

7. Osteoporosis Clinic

Goals and Objectives:

To learn skills related to history taking, examination, assessment and planning for the ambulatory patients with various bone diseases. This clinic is part of the UAB bone center and is staffed by rheumatologists, nephrologists, and a physician

nutritionist. The goal is to provide comprehensive training in the care of patients with metabolic bone disease. The exposure to the bone clinic occurs over one or two months of half-day per week clinics. The following topics are emphasized:

- viii. Idiopathic osteoporosis
- ix. Parathyroid disorder
- x. Steroid induced osteoporosis
- xi. Nutritional management of bone disease
- xii. Renal osteodystrophy

Teaching Methodology:

Patient-based mentored assessment of historical findings, examination, and therapeutic plan. Each patient is seen by a faculty attending. Pragmatic and theoretical issues plus practical, ethical, socioeconomic issues are discussed in this format.

Method of Evaluation:

All subspecialty residents are evaluated at least semiannually. In addition the endocrinology residents evaluate faculty and the clinic as an educational experience semiannually.

8. Laboratory Medicine

Goals and Objectives:

To become familiar with the techniques for measuring the concentrations of hormones and other substances in the blood of patients. This experience is provided by the Department of Pathology and consists of 4 half day sessions provided over the period of a month in the clinical chemistry laboratories. The endocrine residents are familiarized with the following:

- radioimmune assays
- ELISA assays
- Serum lipid measurements
- Sources of assay error

Teaching Methodology:

This rotation is provided by the director of the clinical chemistry laboratory. The residents are introduced to the workstation technicians who explain the nature of the assays being conducted. In addition, didactic lectures are provided during each session on the theoretical basis of the assays.

Method of Evaluation:

The subspecialty residents are evaluated at the end of the rotation. In addition endocrinology residents evaluate the faculty and the clinic as an educational experience.

9. BVAMC Endocrine Clinic

Goals and Objectives:

To learn skills related to history taking, examination, assessment and planning for the ambulatory patients with various endocrine conditions. This clinic sees a broad spectrum of endocrine disorders with somewhat less emphasis on diabetes and more emphasis on general endocrinology. This is compulsory for the subspecialty residents and occurs for one half day each week. The disorders covered are similar to those described for the Fellows' Continuity Clinic at The Kirklin Clinic. Through interaction with the staff available in this clinic (endocrinology, diabetes teaching nurses, dieticians), the subspecialty resident is exposed to the multidisciplinary management of the disease. The major difference between these outpatient clinics is in the faculty that mentor the residents.

After completing this experience, trainees will have a detailed understanding of the pathogenesis, clinical presentation, diagnostic approach, and therapeutic management of endocrine disorders. They will also have been trained in the interpretation of laboratory tests, immunoassay techniques, endocrine imaging studies (e.g. radiologic, radionuclide and ultrasound), fine needle aspiration of the thyroid, and effective communication with the referring services, physicians, or other health care providers.

Teaching Methodology:

Patient-based mentored assessment of historical findings, examination, and therapeutic plan. Each patient is seen by a faculty attending. Pragmatic and theoretical issues plus practical, ethical, socioeconomic issues are discussed in this format.

Method of Evaluation:

All subspecialty residents are evaluated at least semiannually. In addition endocrinology and internal medicine residents evaluate full time and volunteer faculty and the clinic as an educational experience semiannually.

10. Thyroid Ultrasound / Fine Needle Aspiration (FNA) Clinic

Goals and Objectives:

Every fellow is asked to participate in the twice monthly Thyroid Ultrasound and Fine Needle Aspiration (FNA) Clinic throughout the two years of clinical training. During each of these clinics, the fellows have the opportunity to perform, in a closely supervised environment, real time ultrasonography with state of the art equipment (including color flow Doppler) for the evaluation of thyroid goiters and nodules. The team is complemented by a cytopathology technician who helps creating the slides. During each of this sessions an average of 6 patients are seen and evaluated.

The objective of this clinic is to provide the fellows with a closely supervised environment for them to learn the necessary knowledge and skills for the evaluation and management of thyroid nodules. The endocrine fellows learn to evaluate and diagnose thyroid goiters and nodules. They also acquire the necessary skills to perform thyroid ultrasounds, color flow Doppler and fine needle aspiration of the thyroid.

Upon completion of this rotation, fellows will be expected to understand the roles, clinical use and limitations of thyroid ultrasound and Doppler in the evaluation of thyroid nodules. They will understand and be able to perform ultrasound guided fine needle aspirations of the thyroid. Furthermore, they will learn the potential flaws of these tests and how to deal with potential complications.

Teaching Methodology:

The endocrine resident is exposed to patients that will undergo ultrasound guided fine needle aspiration in the endocrine clinic of the TKC. The supervising attending will first demonstrate the performance of these tests and then the fellow will be expected to assist and then perform them independently but while supervised. Several of the thyroid needle aspiration biopsies are examined by the fellow in conjunction with a cytopathologist to provide an appreciation of the assessment of these samples.

Method of Evaluation:

The fellows are evaluated semiannually by the supervising attending faculty for this rotation. In addition the endocrinology fellows evaluate faculty and the clinic as an educational experience semiannually.

11. The Kirklin Clinic – Attending Clinic

Goals and Objectives:

To learn skills related to history taking, examination, assessment and planning for the ambulatory patients with various endocrine conditions. This clinic sees a broad spectrum of general endocrine disorders and diabetes. The fellows are required to attend the clinic of one of the clinical faculty members at the Kirklin Clinic on a rotating basis (3 months with each attending) during their first year of training. The disorders covered are similar to those described for the Fellows' Continuity Clinic at The Kirklin Clinic. Through interaction with the attending and staff available in this clinic (diabetes teaching nurses, dieticians), the subspecialty resident is exposed to the multidisciplinary management of the disease. The major difference between this rotation and their continuity clinic is the fact that the fellow gets to see how each different attending runs their own clinic, as each attending has its very personal clinical interest and expertise, and we all practice medicine a little bit differently.

After completing this experience, trainees will have a detailed understanding of the pathogenesis, clinical presentation, diagnostic approach, and therapeutic management of endocrine disorders. They will also have been trained in the interpretation of laboratory tests, immunoassay techniques, endocrine imaging studies (e.g., radiologic, radionuclide and ultrasound), fine needle aspiration of the thyroid, and effective communication with referring health care providers.

Teaching Methodology:

Patient-based mentored assessment of historical findings, examination, and therapeutic plan. Each patient is seen by a faculty attending. Pragmatic and theoretical issues plus practical, ethical, socioeconomic issues are discussed in this format.

Method of Evaluation:

All subspecialty residents are evaluated at the end of each attending rotation (quarterly). In addition, fellows evaluate all faculty and the clinic as an educational experience semiannually.

12. Reproductive Endocrinology

Goals and Objectives:

This clinic rotation is provided by the Department of Obstetrics and Gynecology as one or two months of rotation with one half day clinic per week. The goal of this clinic is for the endocrine residents to be involved in the management of females with reproductive difficulties. The clinic includes faculty and residents from the Department of Obstetrics and Gynecology. The endocrine resident participates in the evaluation and care of these patients. Subspecialty residents are familiarized

with the diagnosis and management of the following female reproductive disorders:

- Polycystic ovary syndrome with and without insulin resistance.
- Adrenogenital syndromes.
- Hirsutism.
- Infertility due to tubal and endocrine causes.
- Primary and secondary amenorrhea.
- Prolactinoma.

Upon completion of this rotation, trainees will demonstrate proficiency in the endocrinologic evaluation of men and women with infertility. Trainees will understand the normal physiology of the menstrual cycle, ovulation, spermatogenesis, fertilization, and early fetal development. They will also be familiar with the anatomic, gonadal, hypothalamic-pituitary, and systemic causes of infertility in women and men. They will understand how to screen for endocrinologic causes of infertility in women and men, including the use of semen analysis, testicular biopsy, and anatomic evaluation of the female reproductive tract.

Teaching Methodology:

Patient-based mentored assessment of historical findings, examination and therapeutic plan is conducted. Each patient is seen by a faculty attending. Pragmatic and theoretical issues along with diagnostic and therapeutic strategies are discussed.

Method of Evaluation:

The subspecialty residents are evaluated at the end of the rotation. In addition endocrinology residents evaluate the faculty and the clinic as an educational experience.

13. Nutrition

Goals and Objectives:

To learn skills related to history taking, examination, assessment and planning for the ambulatory patients with various nutrition disorders. This clinic is part of the UAB department of Nutrition Sciences and is staffed by physicians specialized in nutrition and nutritionists/registered dietitians. The goal is to provide comprehensive training in the care of patients with nutrition disorders. The exposure to the nutrition clinic occurs over one months of half-day per week clinics. The following topics are emphasized:

- i. Evaluation Obesity & Cardiovascular Risk
- ii. Nutritional and Medical Management of Obesity
- iii. Evaluation of Bulimia and Anorexia Nervosa
- iv. Medical Management of Bulimia and Anorexia Nervosa

Teaching Methodology:

Patient-based mentored assessment of historical findings, examination, and therapeutic plan. Each patient is seen by a faculty attending. Pragmatic and theoretical issues plus practical, ethical, socioeconomic issues are discussed in this format.

Method of Evaluation:

All subspecialty residents are evaluated at the end of their rotation. In addition the endocrinology residents evaluate faculty and the clinic as an educational experience semiannually.

Upon completion of this elective, fellows will be proficient in the evaluation and treatment of patients with obesity, including the recognition of secondary causes of obesity. They will review the current understanding of social, physiologic, and genetic factors in the development of the obesity. They will also demonstrate competency in screening for complications associated with obesity. Trainees will gain experience in the dietary, pharmacologic, and psychosocial therapies available to treat obesity. Also, during this rotation, fellows will gain competency in the recognition, evaluation, and treatment of other eating disorders including bulimia and anorexia nervosa.

C. **Research Experience:**

Goals and Objectives:

In the second year of the endocrine subspecialty training, the resident is expected to participate in a research project. The project can either take the form of a basic laboratory experience or clinical research. The goal is for the resident to appreciate the sources of data from which his clinical decision making derive. The strengths and weaknesses of the research methodology, whether it be statistical or biochemical should be appreciated.

Teaching Methodology:

Basic research training is accomplished through direct participation in a bench research project. The fellow is provided with background literature and given the opportunity to formulate with the mentor a problem to be researched. The techniques for attack of this problem are taught to the fellow by the mentor and other laboratory personnel and the fellow is expected to apply these techniques to the question at hand. Results of each experiment are discussed daily with the mentor and weekly at scheduled laboratory meetings.

Clinical research projects are generally less intensive. These projects can range from collection of patient data to answer a specific question regarding the pathogenesis or treatment of a clinical condition, to the participation in industry sponsored drug trials. The experimental design is discussed with the mentor and progress is monitored on a weekly basis.

Method of Evaluation:

The subspecialty residents are evaluated at the end of the project. The trainee also presents his studies at the appropriate endocrine conference and is evaluated by faculty whose involvement in the project was less direct.