I. Overview

Endocrinology is the diagnosis and care of disorders of the endocrine system. The principal endocrine problems handled by the general internist include goiter, thyroid nodules, thyroid dysfunction, diabetes mellitus, hyper- and hypocalcemia, adrenal cortex hyper- and hypofunction, endocrine hypertension, gonadal disorders, hyper- and hyponatremia, certain manifestations of pituitary tumors, disorders of mineral metabolism, and hyperlipidemias. Obesity is not strictly an endocrine disorder but is considered part of the spectrum of endocrinology because it frequently enters into the differential diagnosis of endocrine disease and is a major element in the management of non-insulin-dependent diabetes. Preventive efforts focus on complications of hyperlipidemias, obesity, thyroid dysfunction, osteoporosis and diabetes mellitus, and on endocrinologic side effects of pharmacologic glucocorticoids and other medications.

The general internist must be able to evaluate and manage common endocrine disorders and refer appropriately. He/she must also be able to evaluate and identify the endocrinologic implications of abnormal serum electrolytes, hypertension, fatigue, and other nonspecific presentations. The general internist plays a key role in managing endocrine emergencies, particularly those encountered in the intensive care unit, including diabetic ketoacidosis and hyperosmolar nonketotic stupor, severe hyper- and hypocalcemia, and addisonian crisis.

During the rotation residents will be expected to perform a history and physical examination on their patients. Responsibility for formulating diagnostic evaluations and treatment plans will be emphasized. Patients will include hospitalized service with a variety of endocrine, metabolic, electrolyte and bone and mineral disorders. The rotation will help residents to evaluate and develop a diagnostic and therapeutic approach to patients with diabetes, thyroid, lipid and osteoporotic disorders. The residents also become familiar with screening guidelines for osteoporosis, diabetes, hypercholesterolemia, subclinical hypo and hyper thyroidism, and asymptomatic primary hyperthyroidism. Residents are also encouraged to attend the attending’s outpatient clinic once a week to broaden the outpatient experience in the subspecialty. Resident responsibilities for the subspecialty rotations are detailed under Section I of the Resident Handbook.
II. **Principle Teaching Methods**

It consists of frequent encounters with the attending physician regarding patient care. The resident will discuss all patients with the attending physician and interpret clinical data to formulate a differential. The attending will assign reading topics on a regular basis and review the material with the residents. This will include accepted national guidelines used in the diagnosis and treatment of various endocrine, metabolic and bone and mineral diseases. The faculty will also critique the residents consult notes, examination and management plan. Rounds will include short 15-30 minute discussions on current topics driven by patient encounters and initiated by resident and completed by the attending physician on most days. Latest information dealing with the topic as provided by literature search and pertinent articles should be discussed.

Residents will also receive outpatient experience in endocrinology by shadowing Dr Sotoudeh one half day a week (Thursday morning at 7:30 am). Residents must turn in a signed attendance sheet (attached at the end of this section) for the month to the program coordinator at the end of the month.

The residents are also required to manage/ interpret results of common endocrine issues. These requirements are delineated in the form of a logsheet at the end of this section. During their rotation residents must make a double sided copy of the logsheet and complete the stated requirements by the end of the month. To receive a satisfactory for the month the residents must turn in a completed logsheet to the program coordinator.

III. **Strengths and Limitations**

The residents will be exposed to a broad range of clinical problems typical of a community-based practice with emphasis on inpatient illness and care. The teaching faculty for the rotation is committed to teaching and patient care with strong role model presentation. For patients with exceptionally unusual clinical problems, the care may require transfer to a tertiary referral center. Outpatient experience in the subspecialty is be obtained by shadowing the attending physician in their private office. Patients in the continuity clinic at Glenridge Medical Center also offer learning opportunities.

IV. **Goals and Objectives**

During the course of the year, residents will receive lectures on the following topics. Residents are advised to pick up cases during the rotation pertaining to one of the following topics after discussion with the chief resident and endocrinology attending. This is to ensure that all of the following topics get covered. Some topics may require more than one scheduled lecture. The topics are:

- Diabetic Ketoacidosis
- Management of diabetes and new diabetic medications
- Thyroid disorders
- Parathyroid disorders and calcium metabolism
- Electrolyte abnormalities (related to sodium, potassium)
- Metabolic bone disease
- Adrenal disorders
- Pituitary disorders
- Sex hormone disorders

**Legend of Learning Activities**

**Learning Venues:**
1. Direct Patient Care/Consultation
2. Attending Rounds
3. Core Lecture Series
4. Self Study

**Evaluation Methods:**
A. Attending Evaluation
B. Direct Observation
C. Nurses’ Evaluation
D. In-training Examination

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<tr>
<th>Competency: Patient Care</th>
<th>Learning Venues</th>
<th>Evaluation Methods</th>
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<tbody>
<tr>
<td>Interview patients skillfully, gathers accurate and essential information with emphasis on endocrine disorders</td>
<td>ALL</td>
<td>A, B, D</td>
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<tr>
<td>Examine patients more skillfully with competent and complete observation of normal and abnormal signs with emphasis on endocrine disorders</td>
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<td>A, B, D</td>
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<td>Define and prioritize patient’s medical problems</td>
<td>1, 2</td>
<td>A, B</td>
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<td>Generate and prioritize differential diagnoses with appropriate testing and therapeusis in a broad range of multisystem disorders as illustrated by endocrine illness</td>
<td>ALL</td>
<td>A, B</td>
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<td>Develop rational, evidence-based management strategies</td>
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<tr>
<td>Demonstrate ability to generate differential diagnosis, diagnostic strategy, and to define appropriate therapeutic plan and modifications to ongoing therapy in patient with diabetes, diabetic ketoacidosis, or hyperglycemic, non-ketotic coma, fluid balance, adrenal and pituitary disorders, and thyroid disorders</td>
<td>1,2,3,4,</td>
<td>A, B, D</td>
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**Competency: Medical Knowledge**

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<tr>
<th>Competency: Medical Knowledge</th>
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<tr>
<td>Expand clinically applicable knowledge base of the basic and clinical sciences underlying the care of patients.</td>
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<td>Access and critically evaluate current medical information and scientific evidence relevant to patient care</td>
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<tr>
<td>Articulate the pathophysiology, evaluation, and management of disorders of the</td>
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<td>A, B, D</td>
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### Endocrine Organs

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<tr>
<th>Competency: Interpersonal and Communication Skills</th>
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<tr>
<td>Interact in an effective way with physicians and nurses participating in the care of patients requiring endocrine consultation or care (including physicians requesting consultation, attendings, medical students, and other personnel)</td>
<td>1,2</td>
<td>A, B, C</td>
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<tr>
<td>Show understanding of differing patient preferences in diagnostic evaluation and management of endocrine disorders</td>
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<td>A, B, C</td>
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<tr>
<th>Competency: Professionalism</th>
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<td>Treat team members, primary care-givers, and patients with respect</td>
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<td>A, B, C</td>
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<td>Actively participate in consultations and rounds</td>
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<td>A, B, C</td>
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<td>Attend and present in scheduled conference</td>
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<td>A, sign in on attendance sheet</td>
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<tr>
<th>Competency: Practice-Based Learning</th>
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<tr>
<td>Identify limitations of medical knowledge in evaluation and management of patients with endocrine disorders and use medical literature to address these gaps in medical knowledge</td>
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<th>Competency: Systems-Based Practice</th>
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<td>Understand barriers to optimal care of patients with diabetes, obesity, and chronic endocrine problems</td>
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<td>Understand how financing of diabetes care and care for chronic medical/endocrine conditions can influence patient care</td>
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<td>Understand need for effective communication between multiple caregivers and sites (e.g., endocrinologists, primary care physicians, diabetes nurse educators, nutritionists, surgeons, interventional radiologists, social workers, hospitals, in- and out-patient units) in delivering optimal care to patients with diabetes and other chronic endocrine problems</td>
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### V. Educational Content

#### A. Pituitary gland

1) Understand the causes and presentation of patients with:
   - Pituitary adenomas
• Prolactinomas
• Panhypopituitarism

2) Interpretation of results of:
• Pituitary and target organ hormones
• Serum prolactin concentration
• Imaging studies of the sella turcica
• Relationship between prolactin, gonadotropin, TSH and medications

B. Thyroid disorders
1) Understand the causes, presentation, pathophysiology, and management of:
• Enlarged thyroid (goiter, nodule)
• Hyperthyroidism, thyrotoxicosis, thyroid storm, thyroiditis
• Hypothyroidism, myxedema coma
• Sick euthyroid
• Thyroid cancers
2) Order appropriate tests and interpret results of:
• Serum thyroid function tests
• Thyroid scanning and ultrasound

C. Parathyroid disorders
1) Understand the causes, presentation, pathophysiology, and management of:
• Hypercalcemia
• Hypocalcemia
• Hyperparathyroidism (primary and secondary)
• Vitamin D metabolism
2) Order appropriate tests and interpret results of:
• Urinary calcium, phosphate, uric acid excretion
• Serum phosphate concentration

D. Adrenal disorders
1) Recognition and management of:
• Primary and secondary adrenal insufficiency, steroid dependency
• Hypercortisolism
• Hypoadrenocortisolism, acute
• Hypoadrenocortisolism, chronic
• Incidentalomas, Adenomas
2) Understand the pathophysiology and interpretation of:
• Dexamethasone suppression test (overnight)
• Home blood glucose monitoring
• ACTH stimulation test
• Urinary sodium, potassium excretion
• Urine metanephrine, VMA (vanillylmandelic acid), and total catecholamine levels

E. Pancreas
1) Know the pathophysiology, complications and updated management guidelines for diabetes as well as treat patients with:
• Diabetic ketoacidosis
• Type 1
• Type 2
- Gestational diabetes
- Exocrine and endocrine functions of pancreas: including the standards of care for DM - cardiovascular risk reduction, BP and lipid control, lifestyle changes
- Islet cell tumors (insulinomas glucagonomas, vipomas)

2) Understand and interpret results of:
- Fasting and standardized postprandial serum glucose concentrations
- Glycohemoglobin or serum fructosamine concentration Microalbuminuria
- Serum and urine ketone concentrations (quantitative or qualitative)
- Serum and urine osmolalities

F. Reproductive/sexual disorders
1) Understand the causes, presentation, pathophysiology, and management of:
- Change in sexual function
- Galactorrhea
- Gynecomastia – differential diagnosis and management
- Hirsutism/virilization
- Hypogonadism, female menopause
- Hypogonadism, male gonadal failure
- Erectile dysfunction
- Menstrual disorders, infertility; PCOS and its relation with metabolic syndrome

2) Order appropriate tests and interpret results of:
- Serum gonadotropin concentrations (follicle-stimulating hormone, luteinizing hormone)
- Estrogen, progesterone
- Serum testosterone concentration

G. Bone disorders
1) Recognition and management of:
- Osteopenia/osteoporosis
- Paget's disease of bone

2) Understand the indications and interpretation of:
- Bone mineral analysis (densitometry)
- Serum alkaline phosphatase activity (for Paget's disease of bone)

H. Metabolic disorders
1) Understand the causes, pathophysiology and treatment of:
- Hyperosmolar state
- Hypoglycemia
- Hyponatremia/hypernatremia (including SIADH, Diabetes Insipidus)
- Lipid disorders
- Obesity and its complications

2) Interpret results of:
- Serum and urine osmolalities
- Lipid profile
- BMI
- Serum and urine electrolytes

I. Paraneoplastic syndromes
1) Recognise presentation, diagnose and management of ectopic hormone production from tumors (like PTHrP etc.)
2) Order appropriate tests and interpret results

VI. Recommended Readings

All senior residents are encouraged to read the MKSAP for Endocrinology during their one-month rotation. Questions will help develop analytical thinking. Residents should also consult the following texts during their rotation regarding the key clinical issues in diagnosis, pathophysiology and therapy raised by the patients they evaluate and care for on the consult rotation:

- Harrison’s Principles of Internal Medicine
- Principles and Practice of Endocrinology and Metabolism by K.L. Becker
- Endocrine Secrets by M.T. McDermott
- Williams Textbook of Endocrinology can be accessed through MDConsult

Residents are also encouraged to use MDConsult and Up To Date to read on a case-by-case basis. Other reading resources are as follows:

A. Diabetes

1) ADA practice recommendations for 2006. Diabetes Care29: S4-42

B. Dyslipidemias

2) Maki KC. Dietary factors in the prevention of diabetes mellitus and coronary artery disease associated with the metabolic syndrome. Am J Cardiol. 2004 Jun 3;93(11A):12C-17C

C. Thyroid Disorders

1) Baeluart K, Franklyn JA. Thyroid hormone in health and disease. Journal of endocrinology 2005, Oct 187 (1) 1-15


3) Vanderpump MP. Tunbridge WM. Epidemiology and prevention of clinical and subclinical hypothyroidism. Thyroid. 2002 Oct;12(10):839-47


7) Fontanilla JC. Schneider AB. Sarne DH. The use of oral radiographic contrast agents in the management of hyperthyroidism. Thyroid. 2001 Jun;11(6):561-7

D. Primary Hyperparathyroidism


4) Rao DS. Parathyroidectomy for asymptomatic primary hyperparathyroidism (PHPT): is it worth the risk? J Endocrinol Invest. 2001 Feb;24(2):131-4


E. Osteoporosis


F. Hormone/Estrogen Replacement Therapy

# PRINCE GEORGE’S HOSPITAL CENTER
# INTERNAL MEDICINE RESIDENCY PROGRAM

## ENDOCRINOLOGY LOGSHEET

**RESIDENT NAME______________________________________________**

**PGY LEVEL_______________            ROTATION MONTH_____________**

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<th>DIABETES MANAGEMENT</th>
<th>ADRENAL FUNCTION/COSYNTROPIN STIMULATION</th>
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PRINCE GEORGE’S HOSPITAL CENTER
INTERNAL MEDICINE RESIDENCY PROGRAM

ENDOCRINOLOGY OUTPATIENT ATTENDANCE SHEET

RESIDENT NAME______________________________________________
PGY LEVEL_________________  ROTATION MONTH_____________

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Outpatient Visits are to be done at the following office:
Dr. F. Sotoudeh
7525 Greenway Center Drive
Ste 209
Greenbelt, MD 20770
Phone: 301-474-0400

Residents must report at 7:30 am every Thursday morning