

Pediatric Endocrinology Syllabus

Credit Hours: 2-4

Contact Information

Name	Position	Phone/Pager	Email
Mark Hamaker, MD	Director	(801) 213-7769	Mark.Hamaker@hsc.utah.edu
Kate Raber	Dept Contact	(801) 213-7767	Kathryn.Raber@hsc.utah.edu
Christie Davis	Coordinator	(801) 662-5710	Christie.Davis@hsc.utah.edu

Course Information

Brief Description of Course

The essential elements of Pediatric Endocrinology involve recognizing and treating disorders of carbohydrate metabolism, growth, sexual development, thyroid function, calcium and bone metabolism, and water balance. The approach used to evaluate the child with a presumed endocrine disorder requires a reasonable knowledge of the basic sciences, including anatomy, biochemistry, physiology, and genetics/molecular biology. As a result of seeing new and established patients in our Pediatric Endocrinology and Diabetes Clinics, the medical student will develop an approach to and gain experience with a number of common conditions that can be managed by a general pediatrician or co-managed with the help of the pediatric endocrinology subspecialist.

Course Goals

As a result of successfully completing the Pediatric Endocrinology Course, students will be able to:

1. Prevention, Counseling and Screening for Endocrine Dysfunction
 - a. Identify the individual at risk for developing endocrine dysfunction through routine endocrine counseling and screening of all patients and parents, addressing:
 - i. Normal variations in growth
 - ii. Expected and normal variations in body changes during puberty
 - iii. The importance of vitamin D supplements in breast-fed infants and select populations with low intake of vitamin D, calcium or phosphorus
 - iv. Screening for diabetes in patients with symptoms of polyuria, polydipsia and polyphagia
 - v. Screening for diabetes, hypercholesterolemia and hypertriglyceridemia in an obese child
 - vi. Newborn metabolic screening for hypothyroidism and congenital adrenal hyperplasia
 - b. Provide preventive counseling to parents and patients with specific endocrine conditions about:
 - i. The need for influenza vaccination in children with certain endocrine disorders
 - ii. The importance of diabetes control for prevention of long-term complications such as retinopathy, neuropathy, nephropathy and gastroparesis
2. Normal, deviations, and pathological states related to endocrinology
 - a. Describe the normal developmental patterns of statural growth and weight gain, with normal variations.
 - b. Perform Tanner staging (SMR) and explain the sequential physiologic events associated with puberty.
 - c. Identify early puberty and differentiate it from premature thelarche and premature adrenarche.
 - d. Describe the hypothalamus-pituitary-peripheral gland axis along with their stimulatory and inhibitory feedback mechanisms.
 - e. Describe calcium and phosphorus homeostasis, vitamin D metabolism, parathyroid hormone functions, and their interrelationships.
 - f. Explain the findings on clinical history and examination that suggest a disease of endocrine origin and require further evaluation and treatment.
 - g. Interpret clinical and laboratory endocrine tests to identify endocrine disease, including: bone age reading, vitamin D, calcium, phosphate and alkaline phosphatase, glucose, insulin, and hemoglobin A1C, T4, free T4, TSH, parathyroid hormone, serum and urine osmolality, cortisol and ACTH, FSH, LH, estradiol,

testosterone, cortisol, renin, adrenal androgens and precursor hormone levels, growth hormone, imaging studies (MRI, CT Scan, Ultrasound, and thyroid scans) and bone densitometry.

3. Evaluation, treatment, referral of patients with possible endocrine disease
 - a. Create a strategy for determining if presenting signs and symptoms are caused by an endocrine disease process and determine if the patient needs treatment or referral
 - i. Short and tall stature
 - ii. Early or delayed puberty
 - iii. Obesity, Acanthosis nigricans
 - iv. Polydipsia, Polyuria, Hyperglycemia
 - v. Hypoglycemia
 - vi. Hypocalcemia
4. Diagnose and manage endocrine conditions not needing referral
 - a. Diagnose, explain the pathophysiology of, and manage:
 - i. Abnormal newborn metabolic screening, including hypothyroidism, congenital adrenal hyperplasia, PKU, and galactosemia
 - ii. Premature thelarche, Premature adrenarche
 - iii. Delayed puberty due to chronic disease or anorexia nervosa
 - iv. Childhood obesity
 - v. Familial short stature, constitutional delay of growth or puberty
 - vi. Short stature variants not meeting criteria for hormone therapy
 - vii. Gynecomastia in a pubertal male
5. Recognition and appropriate referral of patients with endocrine conditions
 - a. Identify, explain the pathophysiology of, provide initial management for, and refer to a subspecialist the following endocrine conditions:
 - i. Adrenal insufficiency
 - ii. Ambiguous genitalia, hypogonadism, and micropenis
 - iii. Central and nephrogenic diabetes insipidus and psychogenic polydipsia
 - iv. Congenital adrenal hyperplasia
 - v. Delayed or precocious puberty
 - vi. Diabetes mellitus type I (diabetic ketoacidosis (DKA))
 - vii. Endocrine and genetic causes of obesity
 - viii. Hirsutism, hyperandrogenism, and polycystic ovaries
 - ix. Hypoglycemia in childhood and adolescence
 - x. Metabolic bone disease including rickets and skeletal dysplasias
 - xi. Abnormalities of calcium, phosphorus, or magnesium homeostasis
 - xii. Short stature variants meeting criteria for hormonal treatment
 - xiii. Thyroid dysfunction and goiters
 - xiv. Diabetes mellitus type II
 - b. Identify the role and general scope of the practice of endocrinology. Recognize situations where children benefit from the skills of specialists trained in the care of children.
6. Diagnose and manage uncomplicated diabetes mellitus
 - a. List the findings on clinical history and examination that suggest a diagnosis of diabetes mellitus
 - b. Identify the risk factors for developing type 2 diabetes and provide screening for those at elevated risk.
 - c. Differentiate Type I and Type II diabetes on the basis of findings from the clinical history, physical examination, and laboratory tests.
 - d. Diagnose diabetes mellitus and diabetic ketoacidosis from presenting symptoms and confirmatory tests.
 - e. Compare and contrast the different preparations of insulin and describe the pharmacokinetics of each.
 - f. Discuss treatment regimens available for patients with Type II diabetes, including the use of oral medications, determination of initial dosages, drug pharmacokinetics, dose adjustments based on serum glucose levels, possible side effects and monitoring for safety.
 - g. Order appropriate initial dosages of insulin, based on both clinical and laboratory findings, and adjust subsequent dosages based on serum glucose levels.
 - h. Order appropriate IV and PO fluids to manage ketoacidosis and initial hyperglycemia with or without ketosis, realizing that insulin therapy may be required in the initial treatment of Type II diabetes.
 - i. Recognize immediate life-threatening complications associated with the diagnosis and treatment of diabetic ketoacidosis and steps for initial treatment and stabilization.
 - j. Develop an educational plan for parents and patients that provides effective education regarding diabetes, availability of support groups and diabetic camps, diet and exercise, home glucose monitoring,

- adjustment of insulin or oral medications dosages, use of insulin pumps, response to illness, and preventive care.
- k. Develop a cost-effective plan for monitoring patients with diabetes, including use of hemoglobin A1-C level, daily glucose profiles to assess control, frequency and severity of hypoglycemia/ hyperglycemia, and the development of long term complications such as retinopathy, nephropathy and neuropathy.
7. Diagnosis and management of patients with congenital and acquired hypothyroidism and hyperthyroidism
 - a. Explain the findings on clinical history, examination, and laboratory tests that suggest the presence of a thyroid disorder (hypo- or hyper-thyroidism).
 - b. Identify thyroid function tests including newborn screening, available for detecting and diagnosing a thyroid disorder, and describe the indications for ordering, limitations and interpretations.
 - c. Discuss the identification, treatment and follow-up in patients with congenital hypothyroidism • Identify imaging studies available for patients with a thyroid disorder and their indications.
 - d. Discuss the causes of hyperthyroidism.
 - e. Compare and contrast the different treatment options for hyperthyroidism, including oral medications, irradiation and surgery, and discuss the selection criteria for each treatment modality.
 - f. Create an education, treatment and follow-up plan for a patient with a thyroid disorder that includes treatment, monitoring, potential complications, and long term follow-up.
 - g. Identify indicators for an endocrine referral of a child with a thyroid disorder.
 8. Diagnostic/screening procedures
 - a. Describe how they work and when they should be used.
 - b. Bone age: interpretation
 - c. Radiologic interpretation: CT of head
 - d. Bone densitometry

Course Format & Sample Schedule

Sample Timeline

4 th Year Medical Student		
Week 1	AM	PM
Monday	Murray	Smego
Tuesday	Smego	Murray
Wednesday	Foster	Hamaker
Thursday	Clements	Foster
Friday	STUDY	DIDACTICS
Week 2	AM	PM
Monday	Smego	Raman
Tuesday	Murray	Clements
Wednesday	Hamaker	Foster
Thursday	Foster	Smego
Friday	STUDY	DIDACTICS

Pediatric Diabetes	Pediatric Endocrine	Study / Didactics (No clinic)
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Pediatric Faculty
Mary Murray, MD
Carol Foster, MD
Vana Raman, MD
Scott Clements, MD
Mark Hamaker, MD
Allison Smego, MD
Kathleen Timme, MD
Dania Al-Hamad, MD
Zoe Raleigh, MD
Alex Karmazin, MD

Didactic Topics
Thyroid
Adrenal
Growth
Puberty
Type 1 Diabetes
OTHER (Calcium and Bone, Fluid Homeostasis, Glucose Metabolism)

Educational and Instructional Modalities

As an example...

Modality	Percentage
Didactic	10%
Clinic Time	80%
Free Study	10%

Role of the Student in this Course

If you are sick or cannot come to clinic, please call Kate at (801) 213-7767 (kathryn.raber@hsc.utah.edu) or Janet at (801) 662-7590 (janet.sirstins@imail.org) to let the attending know.

Didactic are Friday afternoons, if possible. Topics will be identified in a schedule at the start of your rotation.

- **Diabetes and Endocrine Clinics:**
 - The MA will make the follow-up appointment with the patient/family while they are in the exam room.
 - All lab orders and prescriptions are completed in the computer by the provider.
 - Students will be expected, when possible, to help in writing appropriate portions of the clinic note – to be edited afterwards by the provider.
- **Diabetes Clinic:**
 - Pre-conference starts 10-15 minutes before the first patient appointment.
 - Help monitor flow of clinic to ensure that patients have seen both a provider and an educator before leaving the clinic.
 - If you need to speak to the diabetes nurse during clinic, call (801) 213-3599, option #2 then option #1.

Required Textbook(s)/Readings

Some required readings in the form of Journal Articles will be provided during the course of the rotation and will be accessible through Canvas.

All other reference material will be available in clinic. Below are books commonly used for reference in our clinic.

Book Title + ISBN	Author/Publisher/Edition	Approximate Cost
Pediatric Endocrinology and Inborn Errors of Metabolism	Sarafoglou	
Pediatric Endocrinology	Sperling	
SMITH's Recognizable Patterns of Human Malformation	Jones	

Additional Resources

Will be available through Canvas.

Up-to-date

Pubmed

Assessment & Grading

Preceptor Evaluations

For Clinical Courses: This Clinical Course employs a preceptor evaluation which contributes to the student's overall course grade.

Assessments

Assessment Name	Weight toward Final Grade
Preceptor Evaluations	100%

Grading System

Students will receive a final letter grade of PASS (P), or FAIL (F) for this course.

Only elective courses with approved alternative grading schemes may use H/HP/P/F or H/P/F grading

PASS: A student who achieves the criteria, will be assigned a grade of PASS for the course.

FAIL: A student who fails to achieve the criteria for PASS, will be assigned a grade of FAIL for the course.

Student Feedback

Student feedback is an important aspect of curriculum quality improvement. Thus, students are expected to complete all assigned feedback surveys specific to a course by the due date.

Standard Policies

Please refer to the Student Handbook (on the Student Affairs website) for these policies:

- Accommodations**
- Addressing Sexual Misconduct**
- Attendance policy**
- Dress Code**
- Examination and Grading Policies**
- Grade or Score Appeal**
- Professionalism, Roles & Responsibilities**
- Mistreatment**

Alternate Name and/or Personal Pronoun

Class rosters are provided to the instructor with the student's legal name as well as 'Preferred' first name (if previously entered by you in the Student Profile section of your CIS account). While CIS refers to this as merely a preference, we will honor you by referring to you with the name and pronoun that feels best for you in class, on papers, exams, group projects, etc. Please advise us of any name or pronoun changes (and please update CIS) so we can help create a learning environment in which you, your name, and your pronoun will be respected.

Center for Disability & Access Services

The School of Medicine seeks to provide equal access to its programs, services and activities for all medical students. The Center for Disability and Access (CDA) provides accommodations and support for the educational development of medical students with disabilities. Medical students with a documented disability and students seeking to establish the existence of a disability and to request accommodation are required to meet with the CDA Director for recommended accommodations. The CDA will work closely with eligible students and the Academic Success Program to make arrangements for approved accommodations. The School of Medicine and CDA maintain a collegial, cooperative, and collaborative relationship to ensure compliance with federal and state regulations for students with disabilities.

Steven Baumann EdD, School of Medicine Senior Director of Academic Success Program, serves as the liaison between the School Of Medicine and the CDA.

Contact Information:

Dr. Steven Baumann, Senior Director of Academic Success Program

1C047 SOM Office: 801-587-9797

Email: Steven.Baumann@hsc.utah.edu

University of Utah Center for Disability and Access

Olpin Student Union Building, Room 162 Phone (Voice/TDD): (801) 581-5020

<http://disability.utah.edu>