NARRATIVE DESCRIPTION (2015)

PEDIATRIC ENDOCRINOLOGY FELLOWSHIP PROGRAM

Introduction

The fellowship in Pediatric Endocrinology is a three year program providing comprehensive training in clinical patient management and research skills. The fellowship is sponsored by the Virginia Commonwealth University (VCU) and is based at the Medical College of Virginia Hospitals (MCVH), Virginia Commonwealth University Health Systems (VCUHS), Richmond, Virginia. The program is accredited by the ACGME (3265112091).

GOALS AND OBJECTIVES (2015)

PEDIATRIC ENDOCRINOLOGY FELLOWSHIP PROGRAM

Overall Program Goals

The fellowship in pediatric endocrinology and metabolism at Virginia Commonwealth University (VCU) is supported by two tracks.

TRACK 1: The first track (traditional) is designed to train pediatricians for competency and subspecialty board eligibility in pediatric endocrinology and metabolism. Graduates are expected to become independent, competent practitioners who are dedicated to life-long learning. They should be capable of passing the subspecialty boards in pediatric endocrinology and incorporating the scientific process in future academic careers.

TRACK 2: The second track (Master’s in Clinical and Translational Science) is an interdisciplinary program designed to launch selective fellows on a career path that will also lead to competency and subspecialty board eligibility in pediatric endocrinology and metabolism but with a more intense research focus supported by the fields of epidemiology, systems–science, and complex biological systems. Fellows in this track are expected to complete all
degree requirements for the Master’s in Clinical and Translational Science in addition to the clinical work required of a fellowship in pediatric endocrinology and metabolism.

Program Objectives

The program is designed to promote increasing responsibility and independence throughout the three years of training. The Pediatric Endocrine Subspecialty Fellow’s responsibilities are much more broad and more in depth than are those of a General Pediatric Resident.

1. The fellow will become familiar with the presentation, differential diagnosis, and management of endocrine and metabolic disorders in children. This will include but not be limited to such disorders as diabetes, abnormal growth, diseases of the thyroid, abnormalities of sexual differentiation and pubertal development, abnormalities of calcium and mineral metabolism, and others.
   a. The fellow will develop and continually sharpen his/her skills at acquiring a disease history and pedigree.
   b. The fellow will develop and continually sharpen his/her skills at diagnosis of endocrine-metabolic diseases.
   c. The fellow will develop and increase his/her understanding of normal and abnormal function of the endocrine system.

2. The fellow will become familiar with the function of the endocrine laboratory to include the quantitative analysis of hormone levels by radioimmunoassay and other techniques.
   a. The fellow will become familiar with the power and limitations of these techniques.
   b. The fellow will become familiar with limitations in the analysis of hormone levels.
   c. The fellow will become familiar with the appropriate indications for these tests and with their interpretation.
3. The fellow will develop, focus and complete a research study that will lead to publication of a peer-reviewed manuscript.
   a. All fellows will acquire basic skills in biostatistics, epidemiology, research study design, data analysis, and research ethics.
   b. Fellow in the Master’s track will acquire in-depth expertise in these areas.

4. The fellow will develop skills in life-long learning, critical literature review, and practice-based learning improvement

Throughout the three years of training, the fellow will achieve these objectives through mentored clinical patient care, research and didactic learning with increasing levels of responsibility.

**First year program objectives are:**

- To learn the essentials of history, physical examination and tests with a focus on endocrine disorders.
- To develop the ability to perform a detailed endocrine evaluation of the pediatric patient leading to appropriate differential diagnosis, diagnosis and therapy.
- To review the pathophysiology of hormonal secretion and action from prenatal through adolescent age groups.
- To follow patients throughout the hospitalization, recognize management priorities and develop a plan to achieve these goals
- Develop a clear understanding of the ethical, fiscal and legal issues relating to patient care in the hospital setting
- Foster responsibility for patient continuity of care.
- Increase knowledge of the complex interplay between endocrinology and other sub-specialties
- Learn the importance of psychosocial aspects of endocrine disease with emphasis on
early intervention and participation in practical interventions such as psychoendocrine counseling

- Foster adherence to principles of medical ethics with focus on endocrine disorders such as ambiguous genitalia
- Learn the use of flow charts and computer software that enhance quality of care leading to quality improvement
- Choose an area of endocrine interest to be used for a clinical / basic science research program
- Develop skills in supervising pediatric residents and students
- Develop small group teaching skills appropriate for lectures to small groups of medical students/residents (2-4 / group).

**Second Year Objectives are:**

- Continuing to develop and improve the skills acquired in first year
- To understand potential problems and limitations of endocrine testing
- To develop skills in interaction with and acquiring necessary information from primary care physicians leading to effective consultation
- Become increasingly independent in ordering appropriate laboratory tests and procedures
- Improve skills at treatment planning and communicating these to primary care physicians
- Solidify the research focus
- Write a research proposal and obtain IRB approval
- Develop skills at lecturing to larger groups (10-15)
- Prepare an abstract for national presentation
- Complete a project in quality improvement and follow through with effective programs
that lead to improved patient care

**Third Year Objectives are:**

The overall goals for the third year are to become knowledgeable and proficient in the sub-specialty of pediatric endocrinology, to develop critical skills at reading and interpreting pertinent endocrine literature, to develop research skills that will facilitate future academic productivity, to develop interpersonal skills that are professional and conducive to effective utilization of the health care team, and to develop a style and dedication to life long learning.

The specific objectives for the third year are:

- To consolidate skills learned during the first and second years.
- Focus on the clinical / basic science research project leading to preparation and submission of a peer-reviewed manuscript
- Successfully present and defend the research to either the faculty research committee or the Graduate School Research Committee for the Masters in Clinical and Translational Science
- Communicate effectively with referral based health care providers
- Develop effective communication with other sub-specialists
- Demonstrate the ability to prioritize work load in the academic, teaching and patient care arenas
- Formulate short and intermediate goals that define a long-range career trajectory

**Faculty**

**Pediatric Endocrinologists**

The Pediatric Endocrine faculty consists of four (4) board-certified Pediatric Endocrinologists:
1) Gary L. Francis, MD, PhD, CDE is Professor of Pediatrics, Chair of the Division of Pediatric Endocrinology and Metabolism and the Proposed Director of the Fellowship Program. He is certified in Pediatric Endocrinology by the American Board of Pediatrics Subspecialty Examination in Pediatric Endocrinology and as diabetes educator by the National Certification Board of Diabetes Educators (NCBDE).

2) Anshu Gupta, MBBS is Assistant Professor of Pediatrics at VCU. She is certified in Pediatric Endocrinology by the American Board of Pediatrics Subspecialty Examination in Pediatric Endocrinology. She is the Director of the Pediatric Endocrinology Research Program.

3) Melinda Penn, MD is Assistant Professor of Pediatrics at VCU. She is certified in Pediatric Endocrinology by the American Board of Pediatrics Subspecialty Examination in Pediatric Endocrinology. She is Chair of the Pediatric Endocrinology Clinical Competency Committee.

4) Roopa Shankar, MBBS is Assistant Professor of Pediatrics at VCU. She is certified in Pediatric Endocrinology by the American Board of Pediatrics Subspecialty Examination in Pediatric Endocrinology.

The faculty also includes two (2) adjunct faculty:

Edmond Wickham, MD, MPH, is Associate Professor of Medicine, Associate Professor of Pediatrics and Board Certified in Pediatrics, Internal Medicine and Internal Medicine Endocrinology.

Trang Le, MD is Assistant Professor of Medicine, Assistant Professor of Pediatrics, and Board Certified in Pediatrics, Internal Medicine, and Pediatric Endocrinology.

Additional members of the teaching staff include:

Nurse Practitioners:

Rebecca Thalhimer, RN, PNP, is pediatric nurse practitioner working in concert with the
pediatric endocrine team and in clinic part-time 2 days / week.

Shannon Hagan, RN, MSN, PNP is pediatric nurse practitioner working in concert with the pediatric endocrine team and in clinic part-time 3 days / week. She is also study coordinator for the NIH-Sponsored Trailnet Diabetes Program.

Mary Conckright, RN, PNP is pediatric nurse practitioner working in concert with the pediatric endocrine team and in clinic part-time 2 days / week.

Diabetes Educators:

Suzanne Bona, RN, CDE who serves as Diabetes Educator and case manager for children with endocrine disease;

Ellen Dionne, RD, CDE who serves as Nutritional Specialist and Diabetes Educator for Children with Diabetes;

Nutritionists:

Ashley Cappel, RD who serves as Nutritional Specialist and Dietician for the Healthy Lifestyle Program focused on children with obesity or eating disorders;

Psychologists:

Melanie Bean, PhD who is Board Certified Behavioral Psychologist and assists with disease-related adjustment reactions of children or their families and serves as the Director for the Healthy Lifestyle Program for children with obesity.

Rachel Gow, PhD who is Board Certified Behavioral Psychologist and assists with disease-related adjustment reactions of children or their families and has special expertise in dealing with children suffering from eating disorders.

Pediatric Endocrine faculty are assigned attending status on a weekly rotation. The attending is the primary supervisory teacher and consultant for the fellow during that block. He/She makes rounds daily with the fellow on inpatients and consults and is available on call as backup to the
fellow.

The pediatric endocrine fellowship is closely affiliated with the fellowship program in adult endocrinology. The Department of Endocrinology in Internal Medicine is led by Francesco Celi, MD and includes a thirteen (13) member clinical faculty, along with Certified Diabetes Educators, nutritionists, bone density technicians and a research staff. These include: Robert A. Adler, MD, Diane Biskobing, MD, David F. Gardner, MD, Ranjodh Gill, MD, James R. Levy, MD, Stephanie B. Mayer, MD, John E. Nestler, MD, Lori Sweeney, MD, Edmond P. Wickham, MD, Cynthia F. Yazbeck, MD, and Franklin J. Zieve, MD, PhD.

CLINICAL ASPECTS

Clinical aspects of the program are supported by the MCVH at the VCUHS which serves as primary care facility and also houses a large tertiary care referral center with a pediatric endocrine clinic, pediatric diabetes clinic, pediatric inpatient service [including a pediatric intensive care unit (PICU) and an intermediate care unit (PPCU)], a neonatal service [including a neonatal intensive care unit (NICU) and a newborn nursery], and a pediatric emergency service. Serving a referral population of approximately 2,000,000, these services provide 100,000 outpatient visits, 450 air and ground transports, 19,000 emergency room visits, 1,000 intensive care admissions and 3,500 acute care admissions for children annually. The clinical platforms include an 11 bed pediatric emergency room, a 30 bed newborn nursery, a 44 bed NICU, a 14 bed PICU, a 7 bed PPCU (step-down unit), and 48 acute care pediatric beds. The Department of Pediatrics is home to 110 faculty representing 25 sub-specialties, 87 investigator-initiated research programs and 58 clinical trials.
The fellow is provided an opportunity to select his/her clinical mentor from the pediatric endocrine faculty based on his/her special interests / expertise. This mentor will assist the fellow in career choices and selection of a research program / research mentor.

The clinical program spans seventeen (17) months and is composed of block rotations that each span 4 weeks / block. During the first year this will include one block of intense diabetes education, 1 block of clinical pathology (RIA laboratory), one block of research, and 9 blocks of combined inpatient – consultation service. The remaining block in the first year includes 3 weeks of vacation and 1 week to attend a national meeting. The second year includes one block of adult endocrine, one block of genetics, one block of imaging / thyroid clinic, one block of nutrition, and 8 blocks for research. The remaining block in the second year includes 3 weeks of vacation and 1 week to attend a national meeting. The third year includes 11 blocks of research and one block of combined inpatient – consultation service. The remaining block in the third year includes 3 weeks of vacation and 1 week to attend a national meeting. The research program spans 16 blocks and can be devoted to basic, clinical, translational or a combination of these research venues.

The fellows and staff in the pediatric endocrine program participate in a number of didactic activities designed to focus individual learning. These include a monthly pediatric endocrine journal club, a weekly pediatric endocrine core lecture series, a weekly case conference and a monthly pediatric endocrinology-radiology conference. All fellows and faculty in pediatric endocrinology also participate in a number of joint conferences with the internal medicine group throughout the entire three years of the program. These include a weekly journal club and endocrine grand rounds, along with quarterly radiology, oncology and pathology conferences where adult and pediatric cases are discussed. In addition, the fellow is exposed to all research in the Department of Adult Endocrinology to include PCOS, endothelial dysfunction, and bone / mineral metabolism.
Block diagrams for the Conventional Track and the Master's Track are shown below.
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Each rotation is a 4 week block (total 13 / yr). Total number of clinical months _17_ Total number of research months _16_. Vacation will total 3 week / year with one additional week for conference attendance. Typical Ped Endo rotation requires rounds and total 66.5 hr/week. 4A First yr starts daytime pager call. 7B first yr takes night call 1 week-end/mo. Second yr takes night call 1 week-end/mo, third yr takes night call 1 week/mo. 1C = Second yr back-up for incoming fellow. 2D and 3E required, other electives are elective. 12F year three supervises year 1.
## FIRST YEAR BLOCK DIAGRAM TRACK 2 (MASTER’S IN CLINICAL AND TRANSLATIONAL SCIENCE TRACK)

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Organization

Selection of fellows is the responsibility of the Program Director in Pediatric Endocrinology. Interested candidates should apply through ERAS in the spring-summer of the year preceding potential start (ie APR-SEP 2015 for start JUL 2016). Selection of fellows does require interviews with all program faculty and solicitation of their input for proper “fit” of potential candidates. Regardless of the track elected by the fellow, the clinical rotations are identical for both tracks. Individuals may opt to transfer from the traditional track into the Master’s track without prejudice but individuals who resign from the Master’s track may incur financial penalty based on the support they received from the training grant which supports this track from the National Institutes of Child Health and Development, National Institutes of Health.

First Year Pediatric Endocrine Fellow:

The first year of the fellowship emphasizes clinical patient care. First year program objectives are:

- To learn the essentials of history, physical examination and tests with a focus on endocrine disorders.
- To develop the ability to perform a detailed endocrine evaluation of the pediatric patient leading to appropriate differential diagnosis, diagnosis and therapy.
- To review the pathophysiology of hormonal secretion and action from prenatal through adolescent age groups.
- To follow patients throughout the hospitalization, recognize management priorities and develop a plan to achieve these goals
- Develop a clear understanding of the ethical, fiscal and legal issues relating to patient care in the hospital setting
- Foster responsibility for patient continuity of care.
- Increase knowledge of the complex interplay between endocrinology and other
sub-specialties

• Learn the importance of psychosocial aspects of endocrine disease with emphasis on early intervention and participation in practical interventions such as psychoendocrine counseling
• Foster adherence to principles of medical ethics with focus on endocrine disorders such as ambiguous genitalia
• Learn the use of flow charts and computer software that enhance quality of care leading to quality improvement
• Choose an area of endocrine interest to be used for a clinical / basic science research program
• Develop skills in supervising pediatric residents and students
• Develop small group teaching skills appropriate for lectures to small groups of medical students/residents (2-4 / group)

**Pediatric Endocrine Service**

The first year fellow spends nine blocks (4-week each) on the inpatient – consultation service. While on the pediatric endocrine – consultation service, the first year fellow will respond to all daytime pediatric endocrine admissions or consults (Monday – Friday). Pediatric Endocrine faculty are assigned attending status on a weekly rotation. The attending is the primary supervisory teacher and consultant for the fellow during that one week block. He/She makes rounds daily with the fellow on inpatients and consults and is available on call as backup to the fellow. The trainee is responsible for the initial evaluation of patients including history, physical examination, clinical assessment, and proposed approach. The fellow is also responsible for the initial evaluation of consultations and patients admitted to the pediatric endocrine inpatient service. As the year progresses, the fellow assumes increasing responsibility for problem list
formulation and planning diagnostic and therapeutic regimens under the guidance of the attending staff. He/She is provided the opportunity to enhance his/her teaching abilities by discussing other cases with pediatric residents / students who rotate through the pediatric endocrine clinic. The attending provides direct oversight and supervision and will add to the fellow’s discussions as appropriate.

The fellow also assumes the role of primary care provider for patients with chronic problems such as insulin dependent diabetes mellitus, hypopituitarism and congenital adrenal hyperplasia. (S)he will manage these patients in continuity over the entire period of fellowship, in consultation with a staff endocrinologist. These continuity patients are accrued through two separate venues. The first is at the VCU pediatric endocrinology clinic. In this setting, new fellows generate a panel of patients as they evaluate new patients in the clinic. They will also add continuity patients to this panel obtained from patients discharged from the in-patient services or consultations, thus providing them the opportunity to follow patients from admission to discharge and long-term follow-up. Each fellow also has his / her own special interest that will dictate the nature of additional patients added to the panel. For example, a fellow with special interest in thyroid disease may elect to add additional thyroid patients to his/her continuity panel as other patients matriculate. The fellow will thus accrue continuity patients derived from general pediatric consultations to community based and primary care clinic based practices. This offers the fellow the opportunity to broaden the scope of their practice, to develop improved understanding of the VCU health care system and its special requirements / problems, and the opportunity to practice their teaching to general pediatricians and pediatric residents.

The first year fellow will also attend endocrine and diabetes clinic (Wednesday and Friday) at Children’s Pavilion, Endocrine and Diabetes Clinic at Pembrooke on Thursday, and will attend his/her continuity clinic on a weekly basis. Endocrine and diabetes clinic at Children’s Pavilion is attended by on-call faculty members who are also present at clinic
conferences to provide guidance and teaching on the patients seen by the fellow and in the interpretation of laboratory and imaging data as they become available. The continuity clinic is developed by the fellow during his/her tenure and supervised by his/her mentor. It is designed to represent the scope of pediatric endocrinology but also to allow the fellow the opportunity to accumulate a number of patients within his/her own special interests. Such cases could be used for clinical scholarship.

The first year fellow spends one block rotation on diabetes, one block on clinical pathology and one block on research.

The diabetes rotation is designed to solidify important clinical skills during the first month of fellowship. The fellow attends diabetes clinic and diabetes camp, participates in diabetes education classes and diabetes immersion (wearing an insulin pump and sensor), and learns how to manipulate insulin pumps, sensors and meters. The fellow will spend time in the clinics with Ellen Dionne, RD, CDE and Suzanne Bona, RN, CDE with whom they will learn details of diabetes management including diabetes self-management education, down-loading pump and glucose monitor information, evaluating continuous glucose monitor tracings, and participating in all pump starts. The Pediatric Diabetes Education Program at VCU is continuously recognized by the American Diabetes Association from August 2008. The fellow will develop an in-depth knowledge of diabetes management such that (s)he will acquire sufficient skill and technical expertise so that (s)he could develop his/her own diabetes education program after graduation. The program focuses on in-depth practical experience with intensive diabetes therapy, (emphasis on skills in education and pump therapy) and nutritional program development.

The clinical pathology rotation is led by Lorin Bachmann, PhD who is Director of the Clinical Chemistry Laboratory. She will supervise the fellow in obtaining an overview of the use and limitations of hormone assays with techniques such as Immunometric Assays, enzyme
linked immunosorbent assay (ELISA), and BioPlex. The rotation is designed to teach the fellow how hormone assays are performed, the limitations of hormone assays, and the interpretation of hormone assays. Opportunities are provided to become familiar with the tools of molecular investigation. Fellows will learn the power and pitfalls of polymerase chain reaction, DNA sequencing, immunohistochemistry, Western blots, and gene or protein data base query.

**The research block** is designed to allow the first year fellow the opportunity to select a research project and to begin to develop the background reading and specific aims. This will then be expanded during the required research course in year two which is organized by the VCU office of Graduate Medical Education. This 9 week course reviews study design, statistics, human subjects protection, and results in preparation of a completed research proposal for submission to the Institutional Review Board (IRB) early in year 2. This leads the second year fellow in an excellent position for beginning research during month 5.

The first year fellow will select a project appropriate to the fellowship track, define the research goals and objectives, meet with the mentor to fine-tune the hypotheses and technical approach, prepare a 15 min presentation on the proposed investigation which will be presented to the scholarship / graduate committee depending on the research track. Those in the traditional track will present their research proposal to the Scholarship Activity Committee of the Pediatric Endocrinology Fellowship Program. Those in the Master’s track will present to the Graduate Committee in Clinical and Translational Research. Based on these sessions, the fellow will prepare a research proposal for approval and funding.

**Didactic Course Work**

The first year fellow participates in several didactic courses to include research study design, statistics, human subjects protection, HIPAA, and CITI training.

A number of didactic conferences are used to broaden the fellow’s perspective and provide basic science correlation for the clinical experiences. A clinic conference is held during
each endocrine/diabetes clinic during which patients seen are briefly presented and the disposition discussed. This serves as one focus of clinical teaching and the correlations with relevant biochemical, embryologic and/or immunologic pathology.

A core pediatric endocrine conference is held weekly. Attendance is mandatory for all fellows as well as medical students, residents, and adult endocrine fellows rotating through the pediatric endocrine service. This conference consists of an in depth discussion of a scheduled topic with emphasis on basic science and current clinical research. A relevant bibliography and hand out are distributed. The first year fellow will be expected to present approximately one quarter of these conferences with the remaining three quarters to be shared by faculty, senior fellows and/or rotating residents. The conferences will allow the fellow to acquire experience and ease preparing and presenting organized talks, in addition to allowing a forum for communication and dissemination of information among the group as a whole. See Appendix for Schedule.

The fellow is also required to attend the weekly Endocrine Journal Club, Endocrine Grand Rounds, Pediatric Grand Rounds, pediatric endocrine-radiology conference, and a monthly research conference at the VCU. The fellow is assigned specific dates throughout the three years of training for which he/she is responsible for the conference. Pediatric Grand Rounds is assigned to each graduating fellow once during their third year and serves as the final preparation for teaching large audiences. The topic is selected with guidance from their faculty mentor and is researched in depth along with relevant literature citations. The VCU Pediatric Research conference is typically assigned once to each fellow during the latter part of the second or the third year. The fellow presents a summation of their research project beginning with a detailed rationale for their work, followed by results, conclusions and significance. Attendance at all research conferences given by other fellows is required in order to broaden the fellow’s exposure to a wide array of techniques and investigative questions.

The first year fellow also participates in other joint conferences with the adult endocrine
program to include: case conference, radiology conference, pathology conference, and multidisciplinary thyroid conference.

During the course of this year, the fellow shares responsibility with the attending staff for teaching medical students and residents rotating on the pediatric endocrine service. He/She is expected to prepare and present at least 3-4 presentations to the pediatric resident staff morning lecture series at VCU.

Throughout the entire fellowship program, when on service, the fellow is responsible to provide consultation support to the emergency department, general pediatric inpatient services, PICU, PPCU and NICU. The fellow evaluates all consults requested, and presents these to the pediatric endocrine attending. Extended consultation and follow-up will be coordinated with a goal of allowing the fellow to provide continuity of care to all consults. The goal is for the fellow to become proficient in the care of children of all ages with endocrine disease. This will be accomplished through consultation on all endocrine cases, and by didactic sessions oriented toward endocrine disease of that age group.

The fellow is expected to acquire competence in statistics, study design, epidemiology, scientific integrity, and data management. Courses are offered in these topics by the Graduate program at VCU as well as on-line for individual course study.

The fellow will also take the Orientation “Walk the walk” upon assignment to the VCUHS. This is a three day didactic session designed to review the pertinent Federal Codes and Regulations pertaining to patient confidentiality, ethics, human and animal research. The course also covers study design, and basic statistics.

**National Conferences**

The first year fellow is encouraged to spend one week in attendance at a National Meeting such as the Endocrine Society, the American Diabetes Association, the American
Second Year Pediatric Endocrine Fellow:

The overall second year plan is designed to increase the proficiency, independence, and teaching abilities of the fellow. Didactic course work that is designed to improve teaching skills is provided through the VCU. The second year of the program solidifies the pediatric endocrine curriculum and experience through continuity clinic and acquisition of new patients, expands the medical horizons into adult endocrinology, genetics, nutrition and imaging, and is increasingly devoted to research. The fellow will be expected to begin the actual physical work on a clinical or laboratory research project of his/her own design. It is expected that the research project(s) will lead to publication and that the fellow selecting the Master’s track will complete all course requirements for the Master’s Degree in Clinical and Translational Science.

Specific expertise in most other areas of research relevant to endocrinology is available among the faculty (see list of research mentors and project areas). Thus as the fellow desires to learn techniques (i.e., tissue culture, receptor studies, molecular biology, clinical studies, etc.) supervision will be accessed and facilities made available to him/her. The fellow has had preliminary exposure to the principles of endocrine research through journal clubs, conferences and attending supervision during the first year.

Goals and Objectives for the Second Year Include:

- Continuing to develop and improve the skills acquired in first year
- To understand potential problems and limitations of endocrine testing
- To develop skills in interaction with and acquiring necessary information from primary care physicians leading to effective consultation
- Become increasingly independent in ordering appropriate laboratory tests and procedures
• Improve skills at treatment planning and communicating these to primary care physicians
• Solidify the research focus
• Write a research proposal and obtain IRB approval
• Develop skills at lecturing to larger groups (10-15)
• Prepare an abstract for national presentation
• Complete a project in quality improvement and follow through with effective programs that lead to improved patient care

The second year pediatric endocrine fellow has reduced clinical responsibilities that become more focused and provide an opportunity to lead multidisciplinary teams in highly specialized clinical settings. These include one block of adult endocrinology, one block of genetics, one block of imaging / thyroid clinic, one block of nutrition, and then attendance in multidisciplinary clinics for long-term cancer survivors, cystic fibrosis-related diabetes (CFRD), healthy lifestyles, Turner syndrome, transgender, lipid disorders, eating disorders, and thyroid neoplasia. The second year fellow will also attend his/her own continuity clinic.

Adult Endocrine Service Rotation (one block)

The fellowship in adult endocrinology is housed under the internal medicine department at VCU. This group, directed by Francisco Celli, MD consists of eight (8) internists, all of whom are board certified in endocrinology. They represent an impressive resource of research knowledge and productivity as well as clinical experience and expertise. The fellow rotates for one block on the adult endocrine specialty services to include the outpatient clinics. During this time, they are released from all obligations to the core program in Pediatric Endocrinology with the exception of one continuity clinic / week. They evaluate admissions and see consults in the endocrine clinic. The fellow becomes familiar with the progression of endocrine disorders across
the age-spectrum and in particular with regard to issues of infertility, metabolic bone disease, and thyroid diseases.

**Genetics Service Rotation (one month)**

The Training program in Medical Genetics at VCU is under the direction of Margie Jaworski, MD. The fellow rotates for one month on the Genetics service. During this time, (s)he is released from all obligations to the core program in Pediatric Endocrinology with the exception of one continuity clinic / week. (S)he evaluates admissions and sees consults in the pediatric genetics clinic. The fellow becomes familiar with the wide variety of chromosomal, monogenic and syndromic disorders that present to endocrine clinics with alterations of growth, development, or defects in intermediary metabolism to include glycogen storage diseases, fatty-acid oxidation defects, amino acid disorders, and organic acidemias. In addition, the Genetics program maintains clinical research protocols investigating the molecular etiology of a wide variety of conditions to include obesity, fatty-acid oxidation defects, amino acid disorders, organic acidemias, and others. The fellow gains critical skills in the concepts of genetic counseling and in the construction and execution of clinical and molecular research while learning about many of the more rare pediatric endocrine or metabolic disorders.

**Endocrine Imaging / Nuclear Medicine / Thyroid**

Lakshmana Das Narla, MD, MBBS is Chief of pediatric radiology at the VCUHS and will supervise the fellow in developing basic skills and understanding in the field of endocrine imaging. This will include the use of magnetic resonance imaging (MRI), computerized tomography (CT), and ultrasonography (US) for the assessment of endocrine glands and neoplasia as well as bone age radiography.

Melvin J Fratkin, MD is Chief of Nuclear Medicine and will supervise the fellow in
developing his/her understanding of nuclear medicine techniques, safety and federal regulations to include radioactive iodine ablation of the thyroid.

Francisco Celi, MD is Chief of Internal Medicine Endocrinology and head of the thyroid clinic. The fellow will attend thyroid clinic, evaluate patients, participate in performing thyroid ultrasound, interpreting thyroid ultrasound, fine needle aspiration, and other thyroid imaging techniques. Dr Celi will supervise the fellow in developing basic skills and understanding in the field of thyroid disorders.

**Childhood Nutrition Rotation**

Ellen Dionne, RD, CDE and Ashley Cappel, RD will supervise the fellow in acquisition of his/her knowledge of the field of infant and child nutrition. The fellow will rotate on the nutrition clinic at Pembroke during which time (s)he will prepare consultations for the nutrition team including diabetes management and insulin pump therapy, failure to thrive, obesity and eating disorders. The fellow will work with the interdisciplinary teams that include nutrition, human performance, psychology, nursing and medicine. (S)He will develop an appreciation for the complexities of eating disorders, overweight and obesity in our population and an interdisciplinary approach to prevention and treatment.

**Multi-Disciplinary Clinics:**

The second year fellow will attend multidisciplinary clinics in pediatric endocrinology to include: long term cancer survivors, cystic fibrosis-related diabetes (CFRD), healthy lifestyles, Turner syndrome, transgender, lipid disorders, eating disorders, and thyroid neoplasia. These specialized clinics are led by faculty in pediatric endocrinology and other disciplines and provide complex medical care to a wide variety of patients.

**The long-term cancer survivors clinic** is led by Dr Shankar from Pediatric
Endocrinology and Dr Gowda from Hematology Oncology. Approximately 40% of all cancer survivors develop endocrine complications and this clinic provides the opportunity to manage this complex population.

**CFRD** is led by Dr Edmond Wickham, Dr. Melinda Penn, and Ellen Dionne, RD, CDE. This provides the fellow an opportunity to experience a different form of DM with exceptional emotional, nutritional and medical needs.

**The healthy lifestyle clinic** for overweight and obese children is led by Melanie Bean, PhD. Dr Bean is a behavioral psychologist with special expertise in motivational interviewing. The fellow is provided the opportunity to enhance his/her skills in motivational interviewing, and to learn the complex interplay between nutrition, exercise, the environment, behavior and obesity.

**Turner syndrome clinic** is led by Dr. Shankar from Pediatric Endocrinology, Dr Pandya from Genetics, Dr. Cooper from Cardiology, and Dr. Karjane from Obstetrics and Gynecology. This clinic provides a “medical home” for children and adults with Turner syndrome and allows them to be followed throughout the entire life spectrum from birth, through childhood and puberty, into young adult life with assisted fertility and during older age.

**The transgender clinic** is led by Dr. Melinda Penn from Pediatric Endocrinology and Dr. Lisa Griffin PhD from Psychology. This clinic offers the fellow the opportunity to participate in hormone therapy for those pursuing a gender reversal along with the opportunity to participate in the complex psychosocial issues raised by this disorder.

**The lipid disorder clinic** is led by Dr Carter from Pediatric Cardiology. The fellow will learn goals for lipid control and various management strategies.

**The eating disorder clinic** is led by Dr Gow from Child Psychology and Dr Penn from pediatric endocrinology. The fellow will learn the impact of eating disorders on the function of the entire endocrine system, how to interpret hormone levels in patients with eating disorders and
how to manage this complex entity.

**The thyroid neoplasia clinic** is led by Dr Francis from pediatric endocrinology and Dr Grover from surgical oncology. Thyroid cancer is the second most common solid malignancy in adolescent girls and is generally managed by pediatric endocrinology after initial surgery. This clinic provides the opportunity to observe thyroid surgery, radioactive iodine ablation, thyroid ultrasound follow up and management.

The remainder of second year rotations are devoted to research beginning with the required research course (July – Sept) that results in a final research proposal to be submitted to the IRB, selection of a research mentor, submission of a proposal for funding, and direct study participation. It is expected that the second year fellow will have an abstract ready for submission during the latter half of the second year.

**Third year Pediatric Endocrine Fellow**

The third year is devoted to research with a goal to present the findings at a national meeting and to publish research findings in a peer-reviewed journal. The third year fellow will attend continuity clinic and will have one block rotation on the inpatient-consultation service during which (s)he will have primary responsibility to evaluate patients, develop care plans, teach residents, and hone his/her skills for post-fellowship practice.

The overall goals for the third year are to become knowledgeable and proficient in the sub-specialty of pediatric endocrinology, to develop critical skills at reading and interpreting pertinent endocrine literature, to develop research skills that will facilitate future academic productivity, to develop interpersonal skills that are professional and conducive to effective utilization of the health care team, and to develop a style and dedication to life long learning.

The specific objectives for the third year are:
• To consolidate skills learned during the first and second years.
• Focus on the clinical / basic science research project leading to preparation and submission of a peer-reviewed manuscript
• Successfully present and defend the research to either the faculty research committee or the Graduate School Research Committee for the Masters in Clinical and Translational Science
• Communicate effectively with referral based health care providers
• Develop effective communication with other sub-specialists
• Demonstrate the ability to prioritize work load in the academic, teaching and patient care arenas
• Formulate short and intermediate goals that define a long-range career trajectory

The third year will consist of 11 months of time devoted to research, one month of "acting-attending" on the pediatric endocrine service, and any required rotations that might have been deferred due to scheduling conflicts, prolonged illness, etc from adult endocrinology, genetics, imaging or nutrition that would ordinarily be completed during the second year. During the month when the fellow “attends” on the in-patient service, (s)he will make rounds daily during the week (Monday – Friday) and will alternate call on the week-ends and at night with the on-call attending. (S)He will thereby have two week-ends during the month (average one day / week) with no call responsibilities. The fellow will be indirectly supervised by the on-call attending who will independently examine all admissions and consults and discuss these with the fellow should there be any discrepancies in evaluation or plans and will discuss all telephone calls with the fellow during daytime hours unless the fellow feels a need for more direct supervision. On-call attending faculty are always available for the fellow should the need arise.

During the third year, the trainee will attend one clinic day per week (his / her continuity
clinics and attend all clinic conferences).

The third year fellow in the traditional track will be expected to complete, prepare and present his/her research at one or more national meetings and to prepare his/her work for publication in a peer reviewed journal. The third year fellow in the Master’s track will be expected to prepare and present his/her research at one or more national meetings, to prepare his/her work for publication in a peer reviewed journal, and to defend his/her work to the Graduate Thesis Committee.

**On-Call Responsibilities**

During all pediatric endocrine rotations, the fellow will be entirely available to the staff of VCUHS for the duration of the rotation. Pediatric endocrinology does not provide in-house call. Faculty and fellows are available on-call from home. On rare occasion, approximately once/year, there may be an admission so critically ill that the fellow and staff will need to spend the night in the hospital. ACGME guidelines limit the number of hours the trainees can be on call. This requires they be free from all clinical duties and responsibilities at least one day/week (averaged over the month), they work no more than 80 hours/week, if they spend the night in hospital they will be released at 0800 the following AM, and that if they spend the night in hospital they are provided with their own on-call room.

The pediatric endocrine fellow on the inpatient – consultation service will be on-call during daytime hours Monday – Friday for all consults and admissions but will not take night call from home. (S)He will respond to telephone calls during the day under the direct supervision of the attending on-call beginning in OCT of the first year.

The second year pediatric endocrine fellow will be on-call during evening and night hours from home one week-end/month. (S)He will round on all in-patients and consults with the on-call attending and will supervise the pediatric residents and students as they develop and
implement care plans for all in-patients. (S)He will also respond to telephone calls during the week-end hours under the indirect supervision of the attending on-call. The attending will discuss all telephone calls and follow up with the fellow either during or after all calls.

The third year pediatric endocrine fellow will be on-call during evening and night hours from home one week / month. (S)He will round on all in-patients and consults with the on-call attending on week-ends and will supervise the pediatric residents and students as they develop and implement care plans for all in-patients. (S)He will also respond to telephone calls during the evening and week-end hours under the indirect supervision of the attending on-call. The attending will discuss all telephone calls and follow up with the fellow either during or after all calls.

**Didactic Course Work**

Course work is required in basic sciences, epidemiology, biostatistics, study design, ethics, and scientific integrity and are provided through the VCU. VCU is the largest university in Virginia and ranks among the top universities in the country for sponsored research. VCU enrolls more than 32,000 students in 205 certificate and degree programs and is ranked 4th in the nation for health services administration and 57th for clinical psychology. The VCU provides core faculty in Epidemiology and Community Health, Biostatistics, Social Behavioral Health, Child and Adolescent Psychology, Biochemistry and Molecular Biology, Human Genetics, and the Colleges of Allied Health, Nursing, and Pharmacy; administrative support, extensive laboratory research facilities, and a full spectrum of collaborating and supporting disciplines.

Mandatory common core didactic courses are provided at the beginning of fellowship and annually thereafter and are sponsored by the VCUHS. Topics include those related to medical ethics (end-of-life and advanced directives, patient confidentiality), systems based practice (ICD9 and procedure coding, third party collections), personal ethics and professionalism.
Fellows enroll in and complete training in biostatistics through the VCU including BIOS 543 / STAT 543 and BIOS 544 / STAT 544 each of which is a 3 semester hour credit course. Research study design and human subjects protection in research are required and are provided through the Center for Clinical and Translational Research at the VCUHS.

**Additional course work**

Additional course work is provided through the VCU Center for Clinical and Translational Research (CTSA). The Center offers programs in a wide variety of topics such as study design, statistics, epidemiology, human subjects protection and animal use in research. (A detailed description is provided in the course outline)

**Research**

Research experience is provided on an individualized basis according to the interest of the fellow. In general, the fellowship in pediatric endocrinology offers two tracks:

1. **Conventional Track** - designed to provide the clinical skills and research experience necessary to qualify the candidate for the Certification Examination in Pediatric Endocrinology of the American Board of Pediatrics. The fellow electing this track will complete all clinical requirements and course work for the program and will be allowed to elect a research area commensurate with his/her interests. Research options span a wide array of opportunities including molecular biology (role of endothelial growth factors in thyroid cancer), genetics (role of retinoic acid induced 1 in obesity), biochemistry (lipid disorders, role of advanced glycation end products in islet apoptosis), physiology (closed loop control ie artificial pancreas trials in adolescents during exercise, insulin resistance and ovarian function), epidemiology (impediments to successful weight loss in overweight adolescents), and psychology (motivational interviewing for children with obesity). The goal for each fellow is to develop a research focus
that can be maintained into future academic careers and, in the short term, to publish his/her research findings as first author in the peer-reviewed literature. The fellows are also required to participate in national clinical trials (NIH-sponsored Trialnet type 1 diabetes prevention trials) where they gain insight into the structure and function of large multi-center clinical trials.

2. Master's Program in Clinical and Translational Research track sponsored jointly by the Division of Pediatric Endocrinology and the Graduate Program in Clinical and Translational Research. Fellows electing this track will simultaneously complete requirements for the Certification Examination in Pediatric Endocrinology and the Master's in Clinical and Translational Research. The fellow electing this track will complete all clinical requirements and course work for the program but will develop advanced academic skills necessary for a successful academic career in the multidisciplinary team environment of contemporary scientific investigation. This (s)he will obtain through completion of all degree requirements for the Master's in Clinical and Translational Science.

The Master of Science in Clinical and Translational Sciences program is designed for the fellow who wishes to acquire more in-depth research skills. The program is supported by the VCU Center for Clinical and Translational Research (CCTR) which is funded by CTSA award No. UL1TR000058 from the National Center for Advancing Translational Sciences and provides training and mentoring for a new generation of investigators who, regardless of primary area of interest, will be able to understand the methods and techniques used along the pathway from the bench to the bedside and beyond, to the community. The program offers a broad foundation of core courses and emphasizes the importance of interdisciplinary approaches to research. The master's degree can be earned upon completion of 30 credit hours of core and elective courses, including a master's essay in the form of an NIH-style proposal. The program provides a sound foundation in clinical and translational research principles and thereby prepares the student to engage in many components of investigative processes.
The program requires a minimum of 30 credit hours distributed between core and elective courses. The core curriculum, required of all students in the program, consists of 21 credit hours, including a minimum of 6 credit hours in statistics or experimental design. An additional minimum of 9 credit hours of elective courses completes the program. The core provides students with an understanding of the concepts and importance of clinical and translational sciences to the advancement of health care provision and associated patient outcomes, as well as grounds students with the emerging computational tools they will need to become leaders in the advancement of health sciences.

Students will be required to attend the research seminar course each semester they are in the program (and register for the course a minimum of three times) in order to stay abreast of current health and human services research and to develop their communication skills. Additionally, the core includes a course on responsible conduct of research and scientific integrity, which will ensure that students understand the broad ethical implications of biobehavioral and biomedical research, understand what constitutes scientific fraud and misconduct, and are aware of their responsibilities as scientists. A typical program of study will include:

**Core**

- BIOS 571 Clinical Trials 3
- CCTR 520 Fundamentals of Research Regulation 2
- CCTR 550 Foundations of Clinical and Translational Research: The Intersection of Theory and Application 3
- CCTR 690 Research Seminar in Clinical and Translational Sciences 3
- CCTR 700 Master's Essay 3
- OVPR 601 Scientific Integrity 1

Statistics, clinical trial or translational experimental design courses
(chosen with approval of Research Advisory Committee) 6
Electives 9 (chosen with approval of Research Advisory Committee)
Total 30

Additional courses available through the CCTR include:

CCTR 520 Fundamentals of Research Regulation
CCTR 550 Foundations of Clinical and Translational Research: The Intersection of Theory and Application
CCTR 690 Research Seminar in Clinical and Translational Sciences
CCTR 691 Special Topics in Translational Research
CCTR 692 Special Topics in Translational Research
CCTR 700 Master's Essay
CCTR 801, 802, 803 Research Practicum I, II, III
CCTR 810 Foundations of Translational Research
CCTR 815 The NIH Proposal Challenge
CCTR 897 Directed Research in Clinical and Translational Sciences
CCTR 898 Dissertation Research in Clinical and Translational Sciences

The fellow will select a particular research focus commensurate with his/her interests. Fellows in this track will be expected to develop all academic skills required for scientific inquiry and, in the short term, to publish his/her research findings as first author in the peer-reviewed literature. They are also encouraged to participate in national clinical trials (NIH-sponsored Trialnet type 1 diabetes prevention trials) where they gain insight into the structure and function of large multi-center clinical trials.
Regardless of whether the fellow is in the conventional or Master’s Track, during the first year, the fellow is expected to acquire competence in statistics, study design, scientific integrity, and data management. Courses are offered in these topics by the VCU CCTR. Fellows in the conventional track (Track 1) will complete two semester classes in biostatistics (BIOS 543/STAT 543 Statistical Methods I and BIOS 544/STAT 544 Statistical Methods II), each of which grants 3 semester hour credits. For those electing the Master’s Track in Clinical and Translational Research (Track 2) the fellow will take 6 credit hours of didactic course material toward the Master’s Program which will take place during the “research” hours.

Research programs currently underway in the Division of Pediatric Endocrinology and Metabolism include:

1. Healthy Lifestyles Program

This core of the division is supported by the multidisciplinary faculty from pediatric endocrinology, pediatrics, internal medicine, family medicine, psychology, nutrition, pediatric surgery, pediatric cardiology, pediatric hematology – oncology, exercise physiology, social and behavioral health and biostatistics.

Pediatric/Adult Endocrinology

Edmond P. Wickham III, MD MPH

Anshu Gupta, MD

Diane Biskobing, MD

Trang Le, MD

General Pediatrics

Niran R. Wijesooriya, MD

Pediatric Surgery

David Lanning, MD PhD
The program supports 11 active research protocols that have generated 46 publications relating to childhood obesity, its treatment, and its management.

2. **Diabetes**

The diabetes program is supported by an American Diabetes Association Recognized Diabetes Self-Management Education Program, the NIH-Sponsored Trialnet Research Affiliate, and four active research proposals. These clinical studies include Heart Rate as Exercise
Indicator for Closed Loop Control (artificial pancreas) in Children with T1DM, abatacept for prevention of T1DM in at risk relatives, and oral insulin for prevention of T1DM in at-risk individuals. Recently completed studies include the role of prolactin receptor gene polymorphisms in gestational diabetes.

3. **Receptor for Advanced Glycation End Products**

The receptor for advanced glycation end-products (RAGE) appears to have important roles in metabolic syndrome and islet apoptosis. Active protocols investigate alternative mRNA splicing of the RAGE receptor, advanced glycation end-products in children with metabolic syndrome, PCOS or obesity, and a trans-genic mouse knock-out model for RAGE metabolism.

4. **Adult Endocrinology**

The Internal Medicine – Endocrinology program offers a wide variety of research opportunities in the Clinical Research Study Unit or Basic science in the following areas:

- regulation of insulin receptor and leptin gene expression
- regulation of gluconeogenesis and hepatic glucose output
- insulin regulation of human adrenal and ovarian steroidogenesis
- cellular mechanisms of insulin signal transduction
- control of prolactin secretion
- search for a novel pituitary hypercalcemic factor and components of the adenylate cyclase system
- Adolescent obesity and the role of adipokines in weight
- Thyroid hormone regulation and peripheral action

**Endocrine University**

The third year fellow is generally invited to attend Endocrine University, sponsored by the Association of Clinical Endocrinologists and held annually at the Mayo Clinic. This course...
is a one week didactic and hands-on experience leading to certification in thyroid ultrasound, fine needle aspiration (FNA), bone mineral assessment, diabetes education and the radioimmunoassay laboratory.

**Evaluation**

The fellow will be evaluated every month by clinical faculty, every 6-months by the Clinical Competency Committee (CCC) in concert with a self-evaluation and individual learning plan, and annually by a 360 evaluation (see evaluation section below for details). The first meeting of the CCC will be held at the conclusion of the first 6-month of training. For those in the traditional track, the committee will consist of the following standing members / voting faculty: 1. Melinda Penn, MD, Assistant Professor of Pediatrics (Endocrinology) and Chair of the CCC, 2. Edmond Wickham, MD Associate professor Internal Medicine and Pediatrics (Endocrinology), 3. Anshu Gupta, MBBS, Assistant Professor of Pediatrics (Endocrinology), and 4. Roopa Shankar, MBBS, Assistant Professor of Pediatrics (Endocrinology) and 5. Timothy Bunchman, MD, Professor of Pediatrics (Nephrology) who serves as the member outside the discipline. The Program Director, Gary Francis MD, PhD attends as observer without voting privilege. For those in the Master’s track, the committee will consist of the same standing members / voting faculty but additional faculty will be added specific to the research program of the fellow. This has previously included Sarah Elsea, PhD Genetics or Suzanne Barbour, PhD Biochemistry as appropriate for the research work of the trainee.

The CCC will meet on a semi-annual basis to review the progress of each fellow in the program. The committee will review all clinical rotations and evaluate the fellow with respect to the milestones provided by the ACGME Subspecialty Training programs along with the Entrustable Professional Activities (EPAs) listed below. For research rotations, the CCC will review each abstract and manuscript prior to submission for publication and will also have a final
session during which the fellow will defend his / her work in oral format. Written evaluations of each fellow will be prepared during the semi-annual meetings and these will be maintained in the fellow’s academic file (see appendix for evaluation form).

Although the fellow may solicit research supervision from faculty as needed, a specific faculty member will be identified as primary research advisor during the first year. This person will be responsible for providing direction in planning the project and facilitation of the use of specific resources as needed. The advisor will also work to insure that the research is presented to regional and national meetings as well as published. Research faculty are available at the various schools and departments at VCU on an individual basis. Selection of the research mentor shall be coordinated and approved through the Program Director.

**Core Competencies Training:**

The fellows complete training in several areas that directly support acquisition of the core competencies. These include training in consideration of others sponsored by VCUHS, training in ethics and professionalism by VCUHS, and training in sexual harassment VCUHS.

**Evaluation of Core Competencies:**

Evaluation of the fellow's performance will be based on several instruments designed to focus on the areas of core competence outlined by the AAP, ABIM, and ACGME (Patient care, Medical knowledge, Interpersonal skills and communication, Practice based learning and improvement, Professionalism, and Systems based practice).

**Patient care:** Fellows must be able to provide family-centered patient care that is developmentally and age appropriate, compassionate, and effective for the treatment of health problems and the promotion of health.

In accord with this competence, the fellow will acquire and demonstrate skills in gathering essential and accurate information about the patient using medical interviewing, physical
examination, diagnostic studies, and developmental assessment. He/she will make informed diagnostic and therapeutic decisions based on this information, current scientific evidence, and clinical judgement. He/she will develop and carry out patient care plans based on this information, prescribe and perform in a competent manner all indicated tests and procedures, and will counsel the patient and family regarding the measures needed to maintain health, prevent disease, understand illness and its treatment, share decision making, obtain informed consent, comfort and allay fears.

The instruments utilized in assessing this competence include faculty evaluations, peer evaluations, patient/parent questionnaires, and the 360 degree evaluation (evaluation from faculty, peers, residents, general pediatrics faculty, nursing, nutrition, clinic administration, parents, and patients).

**Medical Knowledge:**

Fellows must demonstrate knowledge about established evolving biomedical, clinical, epidemiological, and social-behavioral sciences and the application of this knowledge to the care of patients.

The fellow will acquire skills in the critical evaluation of the literature, current medical information, computer-based search engines, and the scientific evidence on which patient care is based.

Instruments used in these assessments include faculty evaluations, in training examination, participation in rounds and conferences, and certification by Endocrine University in thyroid ultrasound, FNA, bone mineral assessment, diabetes education and the radioimmunoassay laboratory.

**Interpersonal Skills and Communication:**
Fellows must be able to demonstrate interpersonal and communication skills that result in effective information exchange and teaming with patients, parents, and professional associates.

The fellows are expected to acquire skills in communicating in a developmentally, culturally, and educationally appropriate manner with patients and families. They will communicate effectively with physicians, other health professionals, health related agencies, work as an effective member of the health care team, act as a consultant to other physicians and trainees, and maintain comprehensive, legible and timely medical records.

This competence will be assessed by faculty evaluation, peer review, patient/parent surveys, and 360 evaluation.

**Practice Based Learning and Improvement:**

Fellows must be able to use scientific methods and evidence to investigate, evaluate, and improve their patient care practice.

The fellows are expected to take primary responsibility for life-long learning to improve their skills and knowledge. They will analyze their own practice experience to determine their areas of strength and weakness. They will locate, assimilate and appraise the evidence from scientific studies that relate to the care of their patients. They will effectively utilize information technology to facilitate this process. They will acknowledge medical errors and assess means by which to prevent them in the future.

This competence will be assessed by faculty evaluation, peer evaluation, practice portfolios, case logs / chart reviews, participation in rounds and conferences, and by continuous quality improvement projects.

**Professionalism:**

Fellows will demonstrate a commitment to professional responsibilities, adherence to
ethical principals, and sensitivity to diversity.

The fellows will demonstrate respect for and responsiveness to the needs of the patient and society. This will be evidenced by accepting responsibility for patient care, demonstrating integrity, honesty, compassion, and empathy, respecting privacy and autonomy, demonstrating accountability and commitment, and responsiveness to the patient that supercedes that to self.

The instruments used to assess this competency include faculty evaluations, peer evaluations, and patient surveys.

Systems Based Practice:

Fellows must practice quality health care and advocate for patients in the health care system.

The fellows will know how different types of medical practice differ in controlling costs, assuring quality and allocating resources. They will practice cost-effective health care that does not compromise quality, advocate for patient care, know how to work with case managers and systems, and know how to advocate for disease prevention.

The instruments used to assess this competence include faculty evaluations, peer evaluations, patient surveys, and teaching conferences.

Evaluations of trainees and the program:

Periodic formal written evaluations will be made of the trainees and the program. These are designed to monitor the success of the program in meeting the goals and objectives of the educational curriculum.

Formal written evaluations of each fellow will be completed by the attending staff following each rotation (see competencies at a glance) and on a semi-annual basis by all faculty (competency based evaluation forms). These will be collated in anonymous fashion and discussed with the fellow by the program director and by other attending staff as the director
deems necessary. Similarly, the fellow will complete self-evaluations on a semi-annual basis (competencies at a glance). The fellows will also be evaluated on a yearly basis using the 360 degree evaluation in which they are evaluated by the faculty, trainees, peers, students, administrative personnel, parents and patients. This snap-shot provides an overall view of their role in the health care team and especially their sensitivity, professionalism, and management of systems based issues.

The fellow will complete evaluations of the program on an annual basis. The office of the program director will receive these reports, collate them into anonymous feedback, and prepare a summary statement, based on which, the program director will take any appropriate action.

An annual meeting of all members of the attending staff and fellows will be held to evaluate the strengths and weaknesses of the program. This meeting will reassess program objectives of the previous year and serve as a forum to realign the program for the next year to accomplish the fellowship goals for each fellow within the 3 year timeframe of the program.

The performance of fellows on the in-service training examination as well as the pediatric endocrinology board exam of the American Board of Pediatrics will be utilized to help gauge the success of the individual fellow as well as the program strategies.

The program participates in the VCU quality assurance programs. Quality assurance is integrated into the department program and all fellows are expected to participate actively. Each fellow will perform a review that will be presented to the quality assurance meeting and they will be responsible for follow-up of this area. All charts from clinics and inpatients are reviewed on a regular basis by the attending of record. A formal chart review will be conducted by the faculty for each trainee and will become part of the evaluation for patient care and for medical knowledge.

**Facilities**

The fellows have full access to all facilities in the participating institution: The VCU,
VCUHS, and MCVH. Serving a referral population of approximately 2,000,000, the VCU pediatric programs provide 100,000 outpatient visits, 450 air and ground transports, 19,000 emergency room visits, 1,000 intensive care admissions and 3,500 acute care admissions annually. The clinical platforms include an 11 bed pediatric emergency room, a 30 bed well-born nursery, a 50 bed NICU, a 12 bed PICU, a 7 bed PPCU, and 48 acute care pediatric beds. The Department of Pediatrics is home to 110 faculty representing 25 sub-specialties, 87 investigator-initiated research programs and 58 clinical trials.

The MCV hospital serves as the training hospital for the approved pediatric residency program sponsored by the VCUHS.

On December 11, 1837, the president and trustees of Hampden-Sydney College created a medical department in Richmond, which became the Medical College of Virginia in 1854. In 1968, MCV became part of the Virginia Commonwealth University, which today is an urban university with two campuses offering over 150 undergraduate, graduate and professional degree programs.

The core residency program in pediatrics hosts a fully accredited 3-year residency in pediatrics, a combined residency in medicine/pediatrics, and fellowships in six sub-specialties (allergy/immunology, critical care, cardiology, infectious diseases, hematology/oncology and neonatology). There are currently 39 residents in pediatrics, 19 in medicine/pediatrics and 2 in physical medicine/rehabilitation under the pediatric umbrella. Incumbents represent a diverse cross-section of the world having been recruited from throughout the United States and international sites to include Karachi, Belgrade, Zu Koln and Damascus to name but a few.

The VCUHS provides an active teaching faculty. It has extensive research laboratory facilities with access to virtually any type of equipment required for endocrine bench or clinical research. The Virginia Commonwealth University Medical Center is one of the leading academic
medical centers in the country and stands alone as the most comprehensive academic medical center in Central Virginia. VCU Life Sciences has expanded the university’s large-scale life sciences research infrastructure by establishing and maintaining research centers, core facilities and consortia.

**Centers**

- Center for the Study of Biological Complexity
- Center for Environmental Studies
- Inger and Walter Rice Center for Environmental Life Sciences

**Core facilities**

- Bioinformatics Computational Core Laboratories
- Environmental Analyses Laboratory
- Environmental Technology Laboratory
- Mass Spectrometry Laboratory
- MicroArraying Suite
- Nucleic Acid Research Facility

**VCU Massey Cancer Center**

VCU Massey Cancer Center researchers and physician-scientists are affiliated with more than 25 academic departments at VCU. Massey’s hallmark activity is translational research. Clinical trials are a natural extension of the research programs, offering patients access to the most up-to-date treatments for various types of cancer. The new 80,000-square-foot Goodwin Research Laboratory is equipped with state-of-the-art labs and clean rooms to support the next generation of research.
**Core research programs**

- Cancer cell biology
- Cancer prevention and control
- Immune mechanisms
- Radiation biology and oncology
- Structural biology and drug design

**Clinical Research Studies Unit (CRSU)**

Formerly known as the General Clinical Research Center, the CRSU is a major branch of the Center for Clinical and Translational Research supported by the Center for Clinical and Translational Research (CCTR) which is funded by CTSA award No. UL1TR000058 from the National Center for Advancing Translational Sciences. The CRSU operates as a highly specialized research hospital within a larger medical facility. The center is well suited for multidisciplinary clinical research as well as collaborative studies between institutions, supporting clinical investigation into the pathophysiology of human disease and the testing of new methods of diagnosis and treatment of disease.

**Pediatric Endocrinology Service**

The average patient census on the pediatric endocrine inpatient service is 3-5 patients. There are five full days of pediatric endocrine and diabetes clinics each week. The clinic houses a two bed provocative testing unit for growth hormone provocative testing, adrenocorticotropic hormone (ACTH) stimulation testing, gonadotropin releasing hormone (GnRH) stimulation testing, and glucose tolerance testing. The unit is staffed by two nurses, the patients are continuously monitored and the service includes phlebotomy. The Adult Endocrine Service is equipped with a metabolic testing unit, which is available and used by the Pediatric Endocrine
VCUHS provides extensive pediatric support with two certified diabetes educators (one RN/CDE and one RD/CDE), a registered nurse case coordinator, a behavioral psychologist, and a phlebotomist. All are invaluable resources to assist the fellow in mastering the techniques of diabetes management as well as understanding and planning nutritional management of inborn errors of metabolism. In addition, VCUHS houses multiple pediatric sub-specialists including adolescent medicine, gastroenterology, hematology/oncology, cardiology, nephrology, neurology, child psychiatry, child psychology, and an active child-life program. They also have excellent surgical support personnel with a skilled pediatric surgeon, endocrine oncology surgeon, pediatric urology, pediatric ENT and pediatric neurosurgery.

Libraries

The VCU Libraries advance the academic success of students, faculty, staff, and health professionals at Virginia Commonwealth University through one of Virginia's most outstanding academic library systems. The James Branch Cabell Library on the Monroe Park Campus and the Tompkins-McCaw Library on the MCV Campus offer a print collection of over 1.9 million volumes and 16,790 periodical subscriptions, along with an extensive collection of digital indexes, full-text digital periodicals, and other digital materials, to support the academic work of the VCU community. Both libraries provide leading-edge Web-based services as well as exceptional instruction and individual reference consultation to help VCU research, teaching, and learning. With over 300 workstations within the two library facilities and powerful network-integrated systems, the VCU Libraries' collections and resources are available from any computer on the VCU campus and, with your VCU Card number, from anywhere in the world with an Internet connection. The VCU Libraries maintain many affiliations with library and publishing organizations throughout the world to provide access to library materials not held at VCU. VCU
Libraries is a founding member of the Association of Southeastern Research Libraries, the Scholarly Publishing and Academic Resources Coalition, and the Coalition for Network Information. It is also a resource library of the National Network of Libraries of Medicine and a member of the Virtual Library of Virginia (VIVA) and the Southeastern Library Network. Computer literature research facilities are in place in all areas of the VCUHS including nursing stations, libraries, conference rooms, and individual offices.

Pathology

The VCUHS houses complete clinical laboratories, radiology and nuclear medicine services and other ancillary support facilities. The Department of Pathology is a diverse clinical, research, and teaching department of the School of Medicine at VCUHS. They provide a full range of pathology services. Clinical pathology has 31 full-time Pathology faculty based at the MCV Campus and six additional faculty based at the Hunter Holmes McGuire Veterans' Affairs Hospital. They train 16 Residents and six Fellows in the pathology training program. Within the department, there are 14 clinical laboratories including Histopathology, Neuropathology, Cytopathology, Autopsy Pathology, Molecular Diagnostics, Cytogenetics, Hematology, Coagulation, Microbiology, Immunology, Clinical Chemistry, Toxicology, and Transfusion Medicine. The clinical laboratories are staffed by 285 full-time equivalent hospital employees. The labs will perform more than two million billable tests annually. The labs are certified by the Federal Government under the Clinical Laboratory Improvement Amendments of 1988 (CLIA), and are fully accredited by the College of American Pathologists and the American Association of Blood Banks. The quality of work is continuously monitored by extensive internal quality control and participation in proficiency testing which is administered by multiple external agencies. Critical emergency services are available around the clock. Attending pathologists,
resident physicians, and fellows are "on call" at all times for consultation. Clinical pathology scientists are supported by numerous research grants, primarily from NIH, with extramural funding in excess of $2 million in 2007. They host funded research programs in molecular diagnostics, liver disease, hepatobiliary cancer, infectious disease, prostate cancer, breast cancer, aging and conservation medicine. There is also a wide variety of clinical and applied research in all areas of pathology and laboratory medicine. The department offers formal courses in pathology to medical students, dental students and graduate students.

**Radiology**

The Department of Radiology is well grounded in the expertise of more than 40 faculty radiologists, many of whom are recognized both nationally and internationally. The clinical excellence is enhanced further by state-of-the-art equipment in all modalities, including breast imaging, CT, MRI, fluoroscopy, interventional radiology, nuclear medicine and sonography. In addition to traditional radiology services, the Department of Radiology offers many new and cutting-edge procedures, such as thoracic aortic stent grafts, venous ablation, uterine fibroid embolization, radioimmunotherapy, virtual colonography, cardiac MRI, coronary artery CT and breast MRI. Clinical excellence is complemented by major advances in technology. The Department and institution benefit from a state-of-the-art picture archiving and communication system (PACS) and a voice recognition dictation system that allow for images and reports to be distributed to more than 1,200 computers throughout the VCU Medical Center network immediately after acquisition. This allows referring physicians to access images in patient care areas, such as clinics, inpatient units and surgical suites, as soon as the images are acquired, and have access to the reports immediately after the reports are dictated. Since its inception, the Department of Radiology has demonstrated a strong commitment to educational initiatives and
the radiology and nuclear medicine residency program directors, Drs. Das Narla, Malcolm Sydnor and Paul Jolles, ensure that residents receive the most outstanding training available. The Department sponsors eight to ten fellowships each year in a variety of subspecialties, including MRI, Abdominal Imaging, Breast Imaging, Chest and Noninvasive Cardiovascular Imaging, Interventional Radiology, Musculoskeletal Radiology and Women’s Imaging.

The Department’s strength in research activities is supported by a team of seven full-time research scientists. The faculty continues to receive significant awards for funded research from the NIH and other sources. Ongoing clinical research focuses on utility of MRCP in biliary and pancreatic imaging, virtual colonography, development of breast shield for CT radiation protection and the application of CT in trauma.

The faculty research portfolio extends from basic research to clinical trials. Current projects include a five-year NIH basic research grant for the development of metallic nanoparticles, as well as an NIH grant for a phase one clinical trial of a new imaging agent for identification of tumor resistance.

Led by Melvin Fratkin, MD, the Department of Nuclear Medicine houses five full time faculty and a fully accredited residency training program. With the addition of a GE LS Discovery dedicated PET/CT scanner the department achieved state of the art oncology, cardiology and neurology imaging as well as participation in National PET research protocols. Including the facilities of the Molecular Imaging Center (MIC) in the Basement of the Gateway Building which houses the GE Advance PET scanner, PETrace cyclotron, microPET scanner and the GE 3T MR, nuclear medicine at VCU is competitive with other top Universities in the field of Molecular Imaging.
PRACTICE PROFILE:

Data presented at the 1997 Pediatric Endocrinology Program Directors’s Meeting indicate that the average University based pediatric endocrinologist provides the following types of visits:

- diabetes 37-39%
- growth 27%
- thyroid 13%
- puberty 10-11%
- adrenal 5-7%
- other (metabolic etc) 7%

The VCUHS Division of Pediatric Endocrinology and Metabolism is well aligned with this broad-based practice providing care to 800 children with DM, 309 with growth disorders, 441 with thyroid disorders, 455 with reproductive issues, 179 with abnormal function of the anterior pituitary and 253 with obesity along with a diverse array of multiple other problems.

Components of Training Program

<table>
<thead>
<tr>
<th>Components of Training Program</th>
<th>1st Yr</th>
<th>2nd Year</th>
<th>3rd Year</th>
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<tr>
<td>1) Clinical training (blocks):</td>
<td>13</td>
<td>4</td>
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<td>(Inpatient / elective)</td>
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<tr>
<td>Research training (months):</td>
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<td>9</td>
<td>11</td>
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<td>RIA experience (duration):</td>
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<td>Course work (duration):</td>
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<tr>
<td>Outpatient Clinic (days/wk)</td>
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<td>1 ½</td>
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Specify courses:

- Biostatistics for physicians
- Principal Investigator Research
Course

Molecular Biology Short Course

Experience in weeks):
a) Tissue culture methods (describe): *No formal rotations.

Complete facilities and expertise are available and training and experience for fellow will be arranged as derived and/or needed for research projects.

b) Radioimmunoassay
c) Steroid analysis:*
d) Receptor analysis:*
e) Molecular biology:*

2) Night call responsibility:

There are no in-house calls.

During the first year, the fellow will have primary daytime responsibility during Monday - Friday. He/She responds to telephone contacts from patients and primary physicians and to initial evaluations of inpatient consults or problems. A member of the attending staff is immediately available for consultation and direct supervision. **No in-house call is required.**

During the second year, night call for pediatric endocrinology will be provided one weekend out of each month. However no call will be required during selective rotations in adult endocrinology, genetics, imaging, and nutrition.

During the third year, the fellow will provide night call for pediatric endocrinology one week out of each month. In addition, the fellow will spend one month “acting as an attending” for inpatients and consultations with staff attending backup as needed. During that month, the fellow is allowed freedom to round independently with the housestaff and students and to direct the patient care team. The attending physician retains oversight and responsibility for of all patient
care and will round independently with the fellow in accordance with VCUHS guidelines. All patients will be examined by the attending who will monitor care plans and progress. The attending is readily available to the fellow should he/she have immediate questions or concerns. The fellow will be responsible during this month to provide all endocrine teaching of the ward teams (residents, students).

3) Number of clinical rounds per week: Daily rounds will be made on all inpatients and consults for the pediatric endocrine service by the fellow on clinical service. The attending will make rounds on all inpatients and consults with the fellow.

4) Conference per week (specify): The fellow will attend the weekly pediatric grand rounds at VCUHS, weekly endocrine journal club, adult endocrine grand rounds, pediatric endocrine teaching conferences and case conferences. The fellow will also attend monthly research conferences, monthly pediatric endocrinology-radiology conferences, monthly pediatric endocrine journal club, and the combined thyroid / tumor / pathology conferences as scheduled.

5) Numbers and functions of house-officers and students rotating on service: Generally there is one house-officer or student rotating on the pediatric endocrine service. These individuals see patients in the clinic under the direct supervision of the attending staff. They participate in rounds on the inpatient service and attend all pediatric endocrine conferences. Fellows in the second and increasingly during the third year are encouraged to supervise students / residents and precept them with staff back-up.
Educational goals and objectives for Pediatric Endocrinology fellowship, plans formulated to achieve goals, and methods for evaluating attainment of stated goals are outlined in enclosure.

DOCUMENTATION OF ANALYSIS

Performance evaluations will be documented on a regular basis utilizing the following methods:

Direct evaluation on a daily basis by inpatient staff attending.
Monthly evaluation to be completed by all attendings during month.
Quarterly review of all evaluations by faculty mentor
Semi-annual self evaluation and individual learning plan
Semi-annual formal written report from Clinical Competency Committee
Annual 360-evaluation report
Final Summary and Completion Certification for Board Examination by Program Director.
METHODS FOR CORRECTING IDENTIFIED DEFICIENCIES:

A. All trainees will receive verbal feedback at the mid-point and conclusion of each rotation as well as copies of their evaluations on a monthly basis.

B. In addition to being informed on a regular basis of their progress or lack of progress, recommendations will be made for correcting specific deficiencies at the time they are first observed.

C. Failure to meet the milestones expected during the course of training will result in counseling and guidance to remediate the observed deficiencies. If this is unsuccessful, the matter will be referred to the Committee on Graduate Medical Education for consideration of probationary status or other administrative action consistent with guidelines of the VCU Committee on Graduate Medical Education (see Handbook).

Assessment Tools

The fellowship Program in Pediatric Endocrinology and Metabolism is committed to train Pediatric Endocrinologists who are aware of and embrace the interactive competencies involved in the complex profession of medicine. They are committed to lifelong learning, self-reflection and continuous quality improvement. As part of that process we require each fellow to perform a self-evaluation on a semi-annual basis using the milestones that have been developed for pediatric subspecialists. The fellow indicates his/her level of progress toward each milestone and then meets with the program director to review this information and receives documented feedback regarding performance as determined by the clinical competency committee using these same milestones. This semiannual evaluation is then used to construct an individual learning plan to implement during the next 6-month training cycle. We use the entrustable professional activities matrix to determine individual progress in selected procedures and to help identify specific case types that should be an educational focus for the following 6-month training cycle.
EVALUATION OF FELLOW RESEARCH AND PROGRESS:

**KNOWLEDGE OF CONCEPT, GOALS AND OBJECTIVES:**

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<tbody>
<tr>
<td>Lacks basic knowledge of the concept</td>
<td>Can recite goals but little insight into importance</td>
<td>Thorough understanding</td>
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**KNOWLEDGE OF RELEVANT LITERATURE:**

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<td>Lacks awareness of Key literature in Support of the Proposed work</td>
<td>Aware of general reviews of the topic, but lacks specific important Articles to support Key questions / techniques</td>
<td>Thorough knowledge of the supporting literature for the concept and the techniques</td>
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**AWARENESS OF SIGNIFICANCE OF STUDY:**

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<td>Lacks insight Into reasons for The study</td>
<td>Limited ability to infer how the study might change Knowledge or Clinical Practice</td>
<td>Able to foresee in depth application of data to advance knowledge</td>
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**AWARENESS OF LIMITATIONS OF STUDY:**

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<td>Unable to see When the data Might not apply</td>
<td>Can recite some cases where data might not apply</td>
<td>Able to see when data might not apply and how the Study design or techniques used</td>
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<td>Could prevent use of Data for other cases</td>
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**KNOWLEDGE OF TECHNIQUES:**
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<tr>
<td><strong>Unable to describe how the tests were performed</strong></td>
<td>unable to describe how some of the tests were performed</td>
<td>able to describe how all tests and procedures were done and when / how errors were made</td>
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<td><strong>ABILITY TO INTERPRET DATA:</strong></td>
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<td>able to describe how data were derived from raw measures</td>
<td>able to list how data were derived</td>
<td>able to demonstrate how data were obtained, calculated, and statistically analyzed</td>
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<td><strong>ABILITY TO FORMULATE ADDITIONAL QUESTIONS FROM THE STUDY:</strong></td>
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<td>unable to ask any questions based on results of this study</td>
<td>able to ask only basic recitation of the question to another set of similar patients</td>
<td>asks highly inciteful questions of how this data might change the field</td>
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<td><strong>OVERALL PROGRESS:</strong></td>
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<td></td>
<td>inadequate progress to date unable to advance to next year level training</td>
<td>adequate progress able to advance in training</td>
<td>excellent progress able to advance in training</td>
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The undersigned members of the CLINICAL COMPETENCY COMMITTEE of the Fellowship program in Pediatric Endocrinology certify that in our opinion, the above named fellow has completed substantial work on the project as outlined, has documented knowledge of the proposal and procedures sufficient to allow us to determine that he/she had substantial input to the design, conduct, interpretation and evaluation of the work, and is fully worthy of receipt of first author credit for any publications that arise (have arisen) from this study.

Chair, CLINICAL COMPETENCY COMMITTEE: ________________________________

Members: ________________________________
______________________________
______________________________
Final Evaluation and Program Director Summary Description

Dr. [Name] began his / her training on [Date] and completed his / her training on [Date].

This subspecialty resident was continuously evaluated from the beginning of the program up to and including the final 6 months of training. Training was / was not completed in a satisfactory manner.

The overall performance of Dr. [Name] was best characterized as outstanding / good / adequate / marginal.

Dr. [Name] had the following outstanding performance:

Dr. [Name] had the following problems:

In my opinion as Program Director of the VCU Fellowship Program in Pediatric Endocrinology, Dr. [Name] is / is not fully competent and able to sit for the certifying examination in Pediatric Endocrinology and is fully capable of the independent practice of Pediatric Endocrinology.

Gary L. Francis, MD, PhD; Director, Pediatric Endocrinology date:
Potential Applicants Interested in Fellowship Training in Pediatric Endocrinology and Metabolism at the Virginia Commonwealth University in Richmond, VA should contact the Program Director for more specific information, updates on ACGME Approval, the Application Process, Application Deadline and to arrange a personal visit and interview.

Please call or write:

Gary L. Francis, MD, PhD, CDE
Professor and Chair
Division of Pediatric Endocrinology and Metabolism
Virginia Commonwealth University
Department of Pediatrics
Medical College of Virginia
PO BOX 980140
Richmond, VA 23298
Phone (804) 527-4709
FAX (804) 527-4728
Email: glfrancis@vcu.edu
### Entrustable Professional Activities for Pediatric Endocrine Fellows

**Activity Categories**

<table>
<thead>
<tr>
<th>Evaluation tool</th>
<th>Goal</th>
<th>Goal for Expert</th>
</tr>
</thead>
<tbody>
<tr>
<td>DO = direct observation</td>
<td>for Competent</td>
<td>Must be Competent plus</td>
</tr>
<tr>
<td>CR = chart review</td>
<td></td>
<td>DO of teaching</td>
</tr>
<tr>
<td>EX = didactic exam</td>
<td></td>
<td>360 evaluation</td>
</tr>
<tr>
<td>CTF = certificate</td>
<td></td>
<td>EX, ELE, CTF or CSE</td>
</tr>
<tr>
<td>ELE = Elective Rotation</td>
<td></td>
<td>as stipulated</td>
</tr>
</tbody>
</table>

#### History and Physical

- **Perform Endocrine Specific History**
  - DO, CR
  - 1 DO + 5 CR
- **Perform Endocrine Specific Physical Examination**
  - DO, CR
  - 1 DO + 5 CR
- **Perform Tanner staging of male**
  - DO, CR
  - 1 DO + 5 CR (1)
- **Perform Tanner staging of female**
  - DO, CR
  - 1 DO + 5 CR (1)
- **Perform neck palpation for goiter and/or thyroid nodules**
  - DO, CR, ELE
  - 1 DO + 5 CR
- **Perform Prader staging for genital ambiguity**
  - DO, CR
  - 1 DO + 5 CR

#### Provocative Testing

- **Perform and interpret GH Stimulation Test**
  - DO, CR
  - 5 DO + 5 CR
- **Perform and interpret ACTH Stimulation Test**
  - DO, CR
  - 5 DO + 5 CR
- **Perform and interpret Leuprolide Stimulation Test**
  - DO, CR
  - 2 DO + 5 CR
- **Perform and interpret hCG Stimulation Test**
  - DO, CR
  - 1 DO + 5 CR
- **Perform and interpret OGTT**
  - DO, CR
  - 1 DO + 5 CR
- **Perform and interpret MMTT**
  - DO, CR
  - 1 DO + 5 CR
<table>
<thead>
<tr>
<th>Procedure</th>
<th>DO, CR</th>
<th>1 DO + 5 CR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perform and interpret IVGTT</td>
<td></td>
<td></td>
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<tr>
<td>Perform and interpret Insulin Clamp</td>
<td>DO</td>
<td>5 DO</td>
</tr>
<tr>
<td><strong>Diabetes Education and Procedures</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perform New Onset T1DM Education</td>
<td>DO, CR, EX</td>
<td>2 DO + 5 CR</td>
</tr>
<tr>
<td>Perform New Onset T2DM Education</td>
<td>DO, CR, EX</td>
<td>2 DO + 5 CR</td>
</tr>
<tr>
<td>Obtain Pump Settings and/or Download Information</td>
<td>DO, CR</td>
<td>1 DO + 5 CR</td>
</tr>
<tr>
<td>Perform Intensive Insulin Therapy</td>
<td>DO, CR</td>
<td>1 DO + 5 CR</td>
</tr>
<tr>
<td>Perform Insulin Pump Start</td>
<td>DO, CR</td>
<td>2 DO + 5 CR</td>
</tr>
<tr>
<td>Insert Infusion Set</td>
<td>DO</td>
<td>1 DO</td>
</tr>
<tr>
<td>Insert CGMS</td>
<td>DO</td>
<td>1 DO</td>
</tr>
<tr>
<td>Download CGMS</td>
<td>DO</td>
<td>1 DO</td>
</tr>
<tr>
<td>Interpret CGMS</td>
<td>DO, CR</td>
<td>1 DO + 5 CR</td>
</tr>
<tr>
<td>Perform DKA Management</td>
<td>DO, CR</td>
<td>10 DO + 10 CR</td>
</tr>
<tr>
<td>Recognize and Treat Cerebral Edema</td>
<td>DO, CR</td>
<td>1 DO + 5 CR</td>
</tr>
<tr>
<td><strong>Newborn Screening</strong></td>
<td></td>
<td></td>
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<tr>
<td>Interpret newborn thyroid tests</td>
<td>DO, CR</td>
<td>5 DO + 5 CR</td>
</tr>
<tr>
<td>Initiate thyroid therapy</td>
<td>DO, CR</td>
<td>1 DO + 5 CR</td>
</tr>
<tr>
<td>Interpret CAH screening</td>
<td>DO, CR</td>
<td>5 DO + 5 CR</td>
</tr>
<tr>
<td>Manage newborn with salt wasting CAH</td>
<td>DO, CR</td>
<td>1 DO + 5 CR</td>
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</tbody>
</table>
### Imaging

<table>
<thead>
<tr>
<th>Procedure</th>
<th>DO, CR, ELE</th>
<th>CR</th>
<th>Elective</th>
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</thead>
<tbody>
<tr>
<td>Read and interpret bone age radiograph</td>
<td></td>
<td>10 DO + 10 CR</td>
<td>(4) Radiology Elective</td>
</tr>
<tr>
<td>Interpret thyroid US</td>
<td></td>
<td>10 DO + 10 CR</td>
<td>(4) Radiology Elective + (5) CTF, AACE</td>
</tr>
<tr>
<td>Perform thyroid US</td>
<td></td>
<td>10 DO + 10 CR</td>
<td>(4) Radiology Elective + (5) CTF, AACE</td>
</tr>
<tr>
<td>Interpret bone mineral density</td>
<td></td>
<td>1 DO + 5 CR</td>
<td>(6) Bone Elective + (5) CTF, AACE</td>
</tr>
<tr>
<td>Interpret thyroid scan and uptake</td>
<td></td>
<td>1 DO + 5 CR</td>
<td>(4) Radiology Elective</td>
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</tbody>
</table>

### Counseling

<table>
<thead>
<tr>
<th>Task</th>
<th>DO</th>
<th>Notes</th>
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</thead>
<tbody>
<tr>
<td>Counsel family in management of Disorders of Sexual Differentiation</td>
<td>2 DO</td>
<td></td>
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<tr>
<td>Counsel family with imminent loss of life</td>
<td>2 DO</td>
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</table>

### Laboratory Testing

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<thead>
<tr>
<th>Task</th>
<th>CR</th>
<th>CR</th>
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</thead>
<tbody>
<tr>
<td>Identify limitations of immunometric assays</td>
<td>CSE, EX</td>
<td>(7) Laboratory Rotation</td>
</tr>
<tr>
<td>Correctly interpret immunometric analyses of hormone levels</td>
<td>CR</td>
<td>5 CR</td>
</tr>
</tbody>
</table>
Understand age-related Reference ranges for hormone results

Understand gender-related Reference ranges for hormone results

Understand pubertal stage-related Reference ranges for hormone results

Understand diurnal rhythms and test results

**Hormone Therapy**

Diagnose and Manage GH Deficiency

Diagnose and Manage Hypothyroidism

Diagnose and Manage Hyperthyroidism

Diagnose and Manage Hypogonadism

Diagnose and Manage Turner Syndrome

Diagnose and Manage Precocious Puberty

Diagnose and Manage CAH

Diagnose and Manage Cushing’s

Diagnose and Manage Pheochromocytoma

Diagnose and Manage Prolactinoma

Diagnose and Manage Diabetes Insipidus
Diagnose and Manage SIADH        DO, CR        1 DO + 5 CR
Diagnose and Manage Rickets      DO, CR        1 DO + 5 CR
Diagnose and Manage Hypoglycemia DO, CR        1 DO + 2 CR
Diagnose and Manage Transgender DO, CR        1 DO + 5 CR

**Bone**

Diagnose and Manage osteoporosis  DO, CR        1 DO + 2 CR  (6) Bone Elective
Diagnose and Manage Osteogenesis Imperfecta DO          1 DO  (6) Bone Elective

(1) American Academy of Pediatrics Tanner Staging Module to be Completed
(2) Thyroid Elective: one month elective rotation in adult thyroid clinic
(3) NCBDE: Pass National Certification Board of Diabetes Educators
(4) Radiology Elective: one month elective rotation on radiology and imaging
(5) AACE: American Association of Clinical Endocrinology Course Certification in Thyroid US and Bone Mineral Density
(6) Bone Elective: one month rotation on adult bone mineral service
(7) Laboratory Rotation: Pathology RIA lab plus CTSA core lab rotation
(8) Adult Elective: one month rotation in adult endocrine clinic
## Milestones for Assessment of Fellows in Pediatric Endocrinology

**PC1. Provide transfer of care that ensures seamless transitions**

<table>
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<tr>
<th>Level 1</th>
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<th>Level 5</th>
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<tbody>
<tr>
<td>Demonstrates variability in transfer of information (content, accuracy, efficiency, and synthesis) from one patient to the next; makes frequent errors of both omission and commission in the hand-off</td>
<td>Uses a standard template for the information provided during the handoff; is unable to deviate from that template to adapt to more complex situations; may have errors of omission or commission, particularly when clinical information is not synthesized; neither anticipates nor attends to the needs of the receiver of information</td>
<td>Adapts and applies a standardized template, relevant to individual contexts, reliably and reproducibly, with minimal errors of omission or commission; allows ample opportunity for clarification and questions; is beginning to anticipate potential issues for the transferee</td>
<td>Adapts and applies a standard template to increasingly complex situations in a broad variety of settings and disciplines; ensures open communication, whether in the receiver- or the provider-of-information role, through deliberative inquiry, including readbacks, repeat-backs (provider), and clarifying questions (receivers)</td>
<td>Adapts and applies the template without error and regardless of setting or complexity; internalizes the professional responsibility aspect of hand-off communication, as evidenced by formal and explicit sharing of the conditions of transfer (e.g., time and place) and communication of those conditions to patients, families, and other members of the health care team</td>
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</table>
PC2. Make informed diagnostic and therapeutic decisions that result in optimal clinical judgment

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<tbody>
<tr>
<td>Recalls and presents clinical facts in the history and physical in the order they were elicited without filtering, reorganization, or synthesis; demonstrates analytic reasoning through basic pathophysiology results in a list of all diagnoses considered rather than the development of working diagnostic considerations, making it difficult to develop a therapeutic plan</td>
<td>Focuses on features of the clinical presentation, making a unifying diagnosis elusive and leading to a continual search for new diagnostic possibilities; largely uses analytic reasoning through basic pathophysiology in diagnostic and therapeutic reasoning; often reorganizes clinical facts in the history and physical</td>
<td>Abstracts and reorganizes elicited clinical findings in memory, using semantic qualifiers (such as paired opposites that are used to describe clinical information [e.g., acute and chronic]) to compare and contrast the diagnoses being considered when presenting or discussing a case; shows the emergence of pattern recognition in diagnostic and therapeutic reasoning that often results in a</td>
<td>Reorganizes and stores clinical information (illness and instance scripts) that lead to early directed diagnostic hypothesis testing with subsequent history, physical examination, and tests used to confirm this initial schema; demonstrates well-established pattern recognition that leads to the ability to identify discriminating features between similar patients and to avoid premature closure; Selects therapies</td>
<td>Current literature does not distinguish between behaviors of proficient and expert practitioners. Expertise is not an expectation of GME training, as it requires deliberate practice over time</td>
</tr>
<tr>
<td>examination to help decide on clarifying tests to order rather than to develop and prioritize a differential diagnosis, often resulting in a myriad of tests and therapies and unclear management plans, since there is no unifying diagnosis</td>
<td>wellsynthesized and organized assessment of the focused differential diagnosis and management plan</td>
<td>that are focused and based on a unifying diagnosis, resulting in an effective and efficient diagnostic work-up and management plan tailored to address the individual patient</td>
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### PC3. Develop and carry out management plans

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<tbody>
<tr>
<td>Develops and carries out management plans based on directives from others, either from the health care organization or the supervising physician; is unable to adjust plans based on individual patient differences or preferences; communication about the plan is unidirectional from the practitioner to the patient and family</td>
<td>Develops and carries out management plans based on one's theoretical knowledge and/or directives from others; can adapt plans to the individual patient, but only within the framework of one's own theoretical knowledge; is unable to focus on key information, so conclusions are often from arbitrary, poorly prioritized, and timelimited information gathering; develops</td>
<td>Develops and carries out management plans based on both theoretical knowledge and some experience, especially in managing common problems; follows health care institution directives as a matter of habit and good practice rather than as an externally imposed sanction; is able to more effectively and efficiently focus on key information, but still may be limited by time and convenience; begins to incorporate</td>
<td>Develops and carries out management plans based most often on experience; effectively and efficiently focuses on key information to arrive at a plan; incorporates patients' assumptions and values through bidirectional communication with little interference from personal biases</td>
<td>Develops and carries out management plans, even for complicated or rare situations, based primarily on experience that puts theoretical knowledge into context; rapidly focuses on key information to arrive at the plan and augments that with available information or seeks new information as needed; has insight into one's own assumptions and values that allow one to filter them out and focus on the</td>
</tr>
<tr>
<td>Management plans based on the framework of one's own assumptions and values</td>
<td>Patients' assumptions and values into plans through more bidirectional communication</td>
<td>Patient/family values in a bidirectional conversation about the management plan</td>
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PC4. Provide appropriate role modeling

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<th>Level 1</th>
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<tbody>
<tr>
<td>Performs routine duties and behaviors of profession without awareness of the impact on those around him or her; may or may not reflect on actions as they occur (reflection in action) and does not share reflections with others</td>
<td>Inconsistently aware of the impact of one’s behaviors and attitudes on others; sometimes teaches by example; occasionally will reflect openly on events as they occur (reflection in action) and privately on events that have already taken place (reflection on action)</td>
<td>Conscious of being a role model during many interactions; frequently teaches by example and often reflects in action openly in the presence of learners; behavior change implies frequent private reflection on action</td>
<td>Conscious of being a role model during most interactions; routinely teaches by example; regularly reflects in action and frequently reflects on action, sharing this analysis of practice with learners</td>
<td>Role modeling is a habit; recognizes that he or she is a role model in all actions and behaviors at all times; characteristically teaches by example; routinely reflects both in action and on action; examines, analyzes, and explains actions/behaviors in the presence of learners and colleagues</td>
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MK1. Locate, appraise, and assimilate evidence from scientific studies related to their patients' health problems

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<tbody>
<tr>
<td>Explains basic principles of Evidence-based Medicine (EBM), but relevance is limited by lack of clinical exposure</td>
<td>Recognizes the importance of using current information to care for patients and responds to external prompts to do so; is able to formulate questions with some difficulty, but is not yet efficient with online searching; is starting to learn critical appraisal skills</td>
<td>Able to identify knowledge gaps as learning opportunities; makes an effort to ask answerable questions on a regular basis and is becoming increasingly able to do so; understands varying levels of evidence and can utilize advanced search methods; is able to critically appraise a topic by analyzing the major levels of evidence and can utilize advanced search methods; is able to critically appraise a topic by analyzing the major levels of evidence and can utilize advanced search methods</td>
<td>Is increasingly selfmotivated to learn more, as exhibited by regularly formulating answerable questions; incorporates use of clinical evidence in rounds and teaches fellow earners; is quite capable with advanced searching; is able to critically appraise topics and does so regularly; shares findings with others to try to improve their abilities; practices EBM because of the level of evidence and can utilize advanced search methods; is able to critically appraise a topic by analyzing the major levels of evidence and can utilize advanced search methods</td>
<td>Teaches critical appraisal of topics to others; strives for change at the organizational level as dictated by best current information; is able to easily formulate answerable clinical questions and does so with majority of patients as a habit; is able to effectively and efficiently search and access the literature; is seen by others as a role model for practicing EBM</td>
</tr>
<tr>
<td>outcomes, however, may need guidance in understanding the subtleties of the evidence; begins to seek and apply evidence when needed, not just when assigned to do so</td>
<td>the benefit to the patient and the desire to learn more rather than in response to external prompts</td>
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SBP1. Work effectively in various health care delivery settings and systems relevant to their clinical specialty

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<tr>
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<tbody>
<tr>
<td>With limited knowledge of systems, focuses on the &quot;pieces&quot; of a process rather than the whole; frequently frustrated by the system’s suboptimal processes, but lacks the ability to identify the root cause and thus to effect change.</td>
<td>Has developed knowledge of systems and therefore understands when others describe how the pieces relate to the whole; not yet able to articulate that relationship independently, and therefore develops workarounds when faced with a systems challenge.</td>
<td>Competent in working in various systems and settings; therefore, able to apply knowledge, skills, and attitudes in systems thinking to systems' problems within a given context; recognizes the need to change systems rather than develop workarounds, and can activate the system to do so; however, does not apply learning from one setting or context to another.</td>
<td>Capable in systems thinking; therefore, has competence in systems thinking and can adapt learning from one system or setting to another; in this way, can effect or stimulate improvements in a system and does so when the need arises.</td>
<td>Capable, as defined in Level 4, and views improving systems of care as an integral component of professional identity; leads systems changes as part of the routine care delivery process.</td>
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SBP2. Coordinate patient care within the health care system relevant to their clinical specialty

<table>
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<tr>
<th>Level 1</th>
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<tbody>
<tr>
<td>Performs the role of medical decision-maker, developing care plans and setting goals of care independently; informs patient/family of the plan, but no written care plan is provided; makes referrals, and requests consultations and testing with little or no communication with team members or consultants; is not involved in the transition of care between settings</td>
<td>Begins to involve the patient/family in setting care goals and some of the decisions involved in the care plan; a written care plan is occasionally made available to the patient/family; care plan does not address key issues; has variable communication with team members and consultants regarding referrals, consultations, and testing; answers patient/family questions regarding results and</td>
<td>Recognizes the responsibility to assist families in navigation of the complex health care system; frequently involves patient/family in decisions at all levels of care, setting goals, and defining care plans; frequently makes a written care plan available to the patient/family and to appropriately authorized members of the care team; care plan omits few key issues; has good communication, facilitating trust in the patient-physician interaction; develops goals and makes decisions jointly with the patient/family (shared decision-making); routinely makes a written care plan available to the patient/family and to appropriately authorized members of the care team</td>
<td>Actively assists families in navigating the complex health care system; has open communication, facilitating trust in the patient-physician interaction; develops goals and makes decisions jointly with the patient/family (shared decision-making); routinely makes a written care plan available to the patient/family and to appropriately authorized members of the care team</td>
<td>Current literature does not distinguish between behaviors of proficient and expert practitioners. Expertise is not an expectation of GME training, as it requires deliberate practice over time</td>
</tr>
</tbody>
</table>

Current literature does not distinguish between behaviors of proficient and expert practitioners. Expertise is not an expectation of GME training, as it requires deliberate practice over time.
| (e.g., outpatient and inpatient, pediatric and adult); shows little or no recognition of social/educational/cultural issues affecting the patient/family | recommendations; may inconsistently be involved in the transition of care between settings (e.g., outpatient and inpatient, pediatric and adult); makes some assessment of social/educational/cultural issues affecting the patient/family and applies this in interactions | communication with team members and consultants; consistently discusses results and recommendations with patient/family; is routinely involved in the transition of care between settings (e.g., outpatient and inpatient, pediatric and adult); considers social, educational and cultural issues in most care interactions | members of the care team; makes a thorough care plan, addressing all key issues; facilitates care through consultation, referral, testing, monitoring, and follow-up, helping the family to interpret and act on results/recommendations; coordinates seamless transitions of care between settings (e.g., outpatient and inpatient, pediatric and adult; mental and dental health; education; housing; food security; family-to-family support); builds partnerships that foster |
| family-centered, culturally effective care ensuring communication and collaboration along the continuum of care |
SBP3. Incorporate considerations of cost awareness and risk-benefit analysis in patient and/or population-based care as

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<tbody>
<tr>
<td>Unaware of costs issues in evaluation and management of patients; has difficulty processing cost and risk-benefit information in a way that results in cost containment actions or appropriate risk-benefit analysis; frustrated by cost containment efforts that are viewed as primarily externally mandated</td>
<td>Uses externally provided information (e.g., prescribing information, test ordering patterns, or research around a treatment) to inform cost containing action and/or preliminary risk-benefit analysis; demonstrates inadequate skills in critical appraisal that may result in inappropriate costs containment activities and/or risk-benefit counseling</td>
<td>Critically appraises information available on an evaluation test or treatment to allow optimization of cost issues and risk-benefit for an individual patient; adopts strategies that decrease cost and risk and optimize benefits for individuals, with less attention to those outcomes for populations</td>
<td>Critically appraises information in the context of not only the individual patient, but also the broader population/system; ascribes value to cost and risk-benefit decisions based on this broad understanding of the information</td>
<td>Consistently integrates cost analysis into one's practice while minimizing risk and optimizing benefits for whole systems or populations</td>
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SBP4. Work in inter-professional teams to enhance patient safety and improve patient care quality

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<tbody>
<tr>
<td>Seeks answers and responds to authority from only intraprofessionalism colleagues; does not recognize other members of the interdisciplinary team as being important or making significant contributions to the team; tends to dismiss input from other professionals aside from other physicians</td>
<td>Is beginning to have an understanding of the other professionals on the team, especially their unique knowledge base, and is open to their input, however, still acquiesces to physician authorities to resolve conflict and provide answers in the face of ambiguity; is not dismissive of other health care professionals, but is unlikely to seek out those individuals when confronted with ambiguous situations</td>
<td>Aware of the unique contributions (knowledge, skills, and attitudes) of other health care professionals, and seeks their input for appropriate issues, and as a result, is an excellent team player</td>
<td>Same as Level 3, but an individual at this stage understands the broader connectivity of the professions and their complementary nature; recognizes that quality patient care only occurs in the context of the interprofessional team; serves as a role model for others in interdisciplinary work and is an excellent team leader</td>
<td>Current literature does not distinguish between behaviors of proficient and expert practitioners. Expertise is not an expectation of GME training, as it requires deliberate practice over time</td>
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SBP5. Participate in identifying system errors and implementing potential systems solutions

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<tbody>
<tr>
<td>Defensive or blaming when encountering medical error; no perception of personal responsibility for individual or systems error correction; not open to discussion of error or identification of the type of error; approaches error prevention from an individual case perspective only</td>
<td>Occasionally open to discussion of error without a defensive or blaming approach; some awareness of personal responsibility for individual or systems error correction; identifies medical error events, but cannot identify the type (active versus latent) of error; begins to perceive that error may be more than the mistake of an individual</td>
<td>Usually open to a discussion of error; actively identifies medical error events and seeks to determine the type of error; occasionally identifies the element of personal responsibility for individual or systems error correction; sees examination and analysis of error as an important part of the preventive process</td>
<td>Usually encourages open and safe discussion of error; actively identifies medical error events; accepts personal responsibility for individual or systems error correction, regularly determining the type of error and beginning to seek system causes of error</td>
<td>Consistently encourages open and safe discussion of error; characteristically identifies and analyzes error events, habitually approaching medical error with a system solution methodology; actively and routinely engaged with teams and processes through which systems are modified to prevent medical error</td>
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<td>The learner acknowledges external assessments, but understanding of his</td>
<td>Assessment of performance is seen as being able to do or not do the</td>
<td>Prompts for understanding specifics of level of performance are internal and may be identified in response to uncertainty, discomfort, or tension in completing clinical duties; evidence of this stage is demonstrated by active questioning and application of knowledge in developing a rationale for care plans or in teaching activities</td>
<td>Prompted by anticipation or contemplation of potential clinical problems, the learner selfidentifies gaps in KSA through reflection that assesses current KSA versus understanding of underlying basic science or pathophysiologic principles to generate new questions about limitations or mastery of KSA; evidence of this</td>
<td>Prompted by a selfdirected goal of improving the professional self, the practitioner anticipates hypothetical clinical scenarios that build on current experience and systematically addresses identified gaps to enhance the level of KSA; elaborate questioning occurs to further explore gaps and strengths</td>
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<td>performance is superficial and limited to the overall grade or bottom</td>
<td>the task at hand without appreciation for how well it is done and whether there is a need to improve the outcome</td>
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<td>line; has little understanding of how the performance measure relates in a meaningful way to his specific level of Knowledge, Skills and Attitudes (KSA)</td>
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<td>stage can be determined by the advanced nature and level of questioning or resource seeking</td>
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PBL12. Systematically analyze practice using quality improvement methods, and implement changes with the goal of practice improvement

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<td>Unable to gain insight from encounters due to a lack of reflection on practice; does not understand the principles of quality improvement methodology or change management; is defensive when faced with data on performance improvement opportunities within one's practice</td>
<td>Able to gain insight from reflection on individual patient encounters, but potential improvements are limited by a lack of systematic improvement strategies and team approach; is dependent upon external prompts to define improvement opportunities at the population level</td>
<td>Able to gain insight for improvement opportunities from reflection on both individual patients and populations; grasps improvement methodologies enough to apply to populations; is still reliant on external prompts to inform and prioritize improvement opportunities at the population level</td>
<td>Able to use both individual encounters and population data to drive improvement using improvement methodology; analyzes one's own data on a continuous basis, without reliance on external forces, to prioritize improvement efforts, and uses that analysis in an iterative process for improvement; is able to lead a team in improvement</td>
<td>In addition to demonstrating continuous improvement activities and appropriately utilizing quality improvement methodologies, thinks and acts systemically to try to use one's own successes to benefit other practices, systems, or populations; is open to analysis that at times requires course correction to optimize improvement</td>
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<td>Reluctant to utilize information technology; generally does not initiate attempts to use information technology without mandatory assignments and direct help; demonstrates an inability to choose between multiple available databases for clinical query and an inability to filter or prioritize the information retrieved results in too much information, much of which is relevant to the clinical question; basic use of an EHR is improving, as evidenced by greater efficacy and efficiency in performing query and an inability to filter or prioritize the information retrieved results in too much information, much of which is relevant to the clinical question; basic use of an EHR is improving, as evidenced by greater efficacy and efficiency in performing.</td>
<td>Demonstrates a willingness to try new technology for patient care assignments or learning; able to identify and use several available databases, search engines, or other appropriate tools, resulting in a manageable volume of information, most of which is relevant to the clinical question; basic use of an EHR is improving, as evidenced by greater efficacy and efficiency in performing query and an inability to filter or prioritize the information retrieved results in too much information, much of which is relevant to the clinical question; basic use of an EHR is improving, as evidenced by greater efficacy and efficiency in performing.</td>
<td>Efficiently retrieves (from EHR, databases, and other resources), manages, and utilizes biomedical information for solving problems and making decisions that are relevant to the care of patients and for ongoing learning</td>
<td>In addition to the capabilities in Level 3, the emotional investment in the outcome (improved patient care, deeper understanding, or successful resolution of a query) leads to the habit of utilizing familiar information technology resources and seeking new ones to answer clinical questions and remedy knowledge gaps identified in the course of patient care; utilizes the EHR platform to improve</td>
<td>Along with the capabilities and behaviors in Level 4, the mental energy freed up by comfort level and experience with information technology systems is reinvested to contribute to the continuous improvement of current systems and the development and implementation of new information technology innovations for patient care and professional learning</td>
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<td>which is not useful; failure to achieve success may worsen perception of information technology ease of use, leading to resistance to adopting new technologies</td>
<td>needed tasks; beginning to identify shortcuts to getting to the right information quickly, such as use of filters; also beginning to avoid shortcuts that lead one astray of the correct information or perpetuate incorrect information in the EHR</td>
<td>the care not only for individual patients but populations of patients; utilizes evidence-based (actuarial) decision support tools to continually supplement clinical experience</td>
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<td>Has gaps in knowledge and experience that result in a rigid, scripted type of patient education and counseling that may not meet the needs of the patient; Demonstrates doctor-centered interaction.</td>
<td>Is closing gaps in knowledge, allowing him or her to educate patients and families in a somewhat flexible way that begins to meet the needs of the patients; varies between doctor-centered and patient-centered depending upon the circumstances and the family dynamics; is responsive to patient's educational needs; is learning the importance of the concept of checking.</td>
<td>Has a solid breadth of both knowledge and experience, resulting in the ability to modify teaching to meet the needs of the individual patient; his or her educational efforts are typically patient-centered; is able to modify strategies to adapt to complex patient characteristics; checks for patient understanding inconsistently.</td>
<td>Demonstrates broad knowledge base and significant experience with a variety of disease processes and patient characteristics; facilitates the participation of patients in all discussions about their health; able to be quite flexible with strategies of educating patients; patientcenteredness is clearly a priority and a conscious effort; consistently checks for patient understanding; does not leave the patient encounter without knowing that the patient.</td>
<td>Similar to Level 4 in terms of knowledge and flexibility; patientcenteredness is a habit; seamlessly, skillfully, and comfortably educates and interacts with patients in a way that satisfies the patients; demonstrates an uncanny ability to motivate and empower patients to make healthy changes and choices; does not leave the patient encounter without knowing that the patient.</td>
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<td>for patient understanding</td>
<td>empowers and motivates patients</td>
<td>understands the counseling</td>
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PROF1. Professional Conduct: High standards of ethical behavior which includes maintaining appropriate professional boundaries.

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<td>Has repeated lapses in professional conduct wherein responsibility to patients, peers, and/or the program are not met. These lapses may be due to an apparent lack of insight about the professional role and expected behaviors or other conditions or causes (e.g., depression, substance use, poor health)</td>
<td>Under conditions of stress or fatigue, has documented lapses in professional conduct that lead others to remind, enforce, and resolve conflicts; may have some insight into behavior, but an inability to modify behavior when placed in stressful situations</td>
<td>In nearly all circumstances, conducts interactions with a professional mindset, sense of duty, and accountability; has insight into his or her own behavior, as well as likely triggers for professionalism lapses, and is able to use this information to remain professional</td>
<td>Demonstrates an in-depth understanding of professionalism that allows her to help other team members and colleagues with issues of professionalism; is able to identify potential triggers, and uses this information to prevent lapses in conduct as part of her duty to help others</td>
<td>Others look to this person as a model of professional conduct; has smooth interactions with patients, families, and peers; maintains high ethical standards across settings and circumstances; has excellent emotional intelligence about human behavior and insight into self, and uses this information to promote and engage in professional behavior as well as to prevent lapses</td>
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**PROF2. Trustworthiness that makes colleagues feel secure when one is responsible for the care of patients**

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<td>Has significant knowledge gaps or is unaware of knowledge gaps and demonstrates lapses in data-gathering or in follow-through of assigned tasks; may misrepresent data (for a number of reasons) or omit important data, leaving others uncertain as to the nature of the learner's truthfulness or awareness of the importance of attention to detail and accuracy; overt lack of truth-telling is</td>
<td>Has a solid foundation in knowledge and skill, but is not always aware of or seeks help when confronted with limitations; demonstrates lapses in follow-up or follow-through with tasks, despite awareness of the importance of these tasks; follow-through can be partial, but limited due to inconsistency or yielding to barriers; when such barriers are experienced, no escalation occurs</td>
<td>Has a solid foundation in knowledge and skill with realistic insight into limits with responsive help seeking; data-gathering is complete with consideration of anticipated patient care needs, and careful consideration of high-risk conditions first and foremost; requires little prompting for follow-up</td>
<td>Has a broad scope of knowledge and skill and assumes full responsibility for all aspects of patient care, anticipating problems and demonstrating vigilance in all aspects of management; pursues answers to questions, and communications include open, transparent expression of uncertainty and limits of knowledge</td>
<td>Same as Level 4, but any uncertainty brings about rigorous search for answers and conscientious and ongoing review of information to address the evolution of change; may seek the help of a master in addition to primary source literature</td>
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<td>assessed in a professionalism competency</td>
<td>as notifying others or pursuing alternative solutions</td>
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PROF3. Provide leadership skills that enhance team functioning, the learning environment, and/or the health care delivery system/environment with the ultimate intent of improving care of patients

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<td>Does not define/clarify roles and expectations for team members; team management is disorganized and inefficient; interacts with supervisor(s) in an unfocused and indecisive manner; open communication is not encouraged within the team; team members are not given ownership or engaged in decisionmaking; manages by</td>
<td>Interactions suggest that there are roles and expectations for team members, but these are not explicitly defined; manages the team in a somewhat organized manner; interacts with supervisor(s) in a somewhat focused, but poorly decisive manner; begins to encourage open communication within the team; sometimes engages team members in decisionmaking</td>
<td>Provides some explicit definition to roles and expectations for team members; manages the team in an organized and focused manner; interactions with supervisor(s) are focused and decisive in most cases; open communication within the team is routinely encouraged; team members are routinely engaged in decision-making and are encouraged to take ownership in care</td>
<td>Routinely clarifies roles and expectations for team members; manages the team in an organized and fairly efficient manner; interactions with supervisor(s) are focused and decisive; creates a foundation of open communication within the team; team members are expected to engage in decision-making and are encouraged to take ownership in care; utilizes consensus-building and</td>
<td>Routinely clarifies roles and expectations for team members; team management is organized and efficient; interacts with supervisor(s) in a focused and decisive manner; creates a strong sense of open communication within the team; team members routinely engage in decision-making and are expected to take ownership in care; utilizes consensus-building and</td>
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<td>mandate; unable to advocate effectively for the team with faculty members, staff members, families, patients, and others</td>
<td>decision-making process; manages most often through direction, with some effort towards consensus building; attempts to advocate for the team with faculty members, staff members, families, patients, and others</td>
<td>some ownership in care; usually manages through consensus-building and empowerment of others, but sometimes reverts to being directive; advocates somewhat effectively for the team with faculty members, staff members, families, patients, and others</td>
<td>process and empowerment of others, only in rare instances becoming directive; advocates effectively for the team with faculty members, staff members, families, patients, and others</td>
<td>empowerment are the norm; proactively and effectively advocates for the team with faculty members, staff members, families, patients, and others; inspires others to perform</td>
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PROF4. The capacity to accept that ambiguity is part of clinical medicine and to recognize the need for and to utilize appropriate resources in dealing with uncertainty

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<td>Feels overwhelmed and inadequate when faced with uncertainty or ambiguity; communications with patients/families and development of therapeutic plan are rigid and authoritarian, with assumption that the patient can manage information and participate in decisionmaking; patient/family numeracy presumed; seeks only self or</td>
<td>Recognizes uncertainty and feels tension/pressure from not knowing or knowing with limited control of outcomes; explains situation to the patient in framework most familiar to the physician, rather than framing it with terms, graphics, or analogies familiar to the patient; seeks rules and statistics and feels compelled to transfer all information to the patient immediately, regardless</td>
<td>Anticipates and focuses on uncertainty, looking for resolution by seeking additional information; aims to inform the patient of the more optimal outcome(s), framed by physician goals; does not manage overall balance of patient/family uncertainty with quality of life, need for hope, and ability to adhere to therapeutic plan; focuses on own risk management position for</td>
<td>Anticipates that uncertainty at the time of diagnostic deliberation will be likely; uses such uncertainty or larger ambiguity as a prompt/motivation to seek information or understanding of unknown (to self or world); balances delivery of diagnosis with hope, information, and exploration of individual patient goals; works through concepts of risk versus hope using</td>
<td>Is aware of and keeps own risk aversion or risk-taking position in check; seeks to understand patient/family goals for health and their capacity to achieve those goals, given the uncertain treatment options; engages in discussion with high sensitivity towards numeracy, emphasizing patient/family control of choices with initial plan development and ongoing</td>
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<td>selfavailable resources to manage response to this uncertainty, resulting in a response characterized by their (individual) preexisting state of risk aversion or risk taking; does not regard patient need for hope; feels compelled to make sure that patients understand full potential for negative outcome (defensive/protective of physician)</td>
<td>of patient readiness, patient goals, and patient ability to manage information</td>
<td>a given problem and does not suggest that more or less risk taking (different from physician’s position) could be chosen; still seeks patient/parent recitation of uncertainty/morbidity as proof that patient/family understands the uncertainty; has an unresolved balance of expectations with physician expectations taking precedence</td>
<td>conceptual framework that includes cost (e.g., suffering, lifestyle changes, financial) versus benefit, framed by patient health care goals; expresses openness to patient position and patient uncertainty about his or her position and response</td>
<td>information sharing through changes as knowledge and patient health status evolve; remains flexible and committed to engagement with the patient/family throughout the patient's illness, serving as a resource to gather information so that degree of uncertainty is minimized; openly and comfortably discusses strategies and outcomes anticipated with the patient/family, emphasizing that all plans are subject to the imperfect knowledge and</td>
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<td>state of uncertainty; balances constant revisiting of knowledge, uncertainty, and developed plans acceptance of what is unknown; transparent communication of limits of treatment plan outcomes</td>
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ICS1. Communicate effectively with physicians, other health professionals, and health-related agencies

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<td>Demonstrates a rigid, rules-based recitation of facts; often communicates from a template or prompt; communication does not change based on context, audience, or situation; not aware of the social purpose of the communication</td>
<td>Begins to understand the purpose of the communication and at times adjusts length to context, as appropriate; however, will often still err on the side of inclusion of excess details</td>
<td>Successfully tailors communication strategy and message to the audience, purpose, and context in most situations; fully aware of the purpose of the communication; can efficiently tell a story and effectively make an argument; beginning to improvise in unfamiliar situations</td>
<td>Uses the appropriate strategy for communication; distills complex cases into succinct summaries tailored to audience, purpose, and context; can improvise and has expanded strategies for dealing with difficult communication scenarios (e.g., an inter-professional conflict)</td>
<td>Master of improvisation in any new or difficult communication scenario; recognized as a highly effective public speaker; intuitively develops strategies for tailoring message to context to gain maximum effect; is sought out as a role model for difficult conversations and mediator of disagreement</td>
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ICS2. Work effectively as a member or leader of a health care team or other professional group

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<td>Limited participation in team discussion; passively follows the lead of others on the team; little initiative to interact with team members; more selfcentered in approach to work with a focus on one's own performance; little awareness of one's own needs and abilities; limited acknowledgment of the contributions of others</td>
<td>Demonstrates an understanding of the roles of various team members by interacting with appropriate team members to accomplish assignments; actively works to integrate herself into team function and meet or exceed the expectations of her given role; in general, works towards achieving team goals, but may put personal goals related to professional identity development (e.g.,</td>
<td>Identifies him or herself and is seen by others as an integral part of the team; seeks to learn the individual capabilities of each fellow team member and will offer coaching and performance improvement as needed; will adapt and shift roles and responsibilities as needed to adjust to changes to achieve team goals; communication is bi-directional with verification of understanding of the</td>
<td>Initiates problem-solving, frequently provides feedback to other team members, and takes personal responsibility for the outcomes of the team's work; actively seeks feedback and initiates adaptations to help the team function more effectively in changing environments; engages in closed loop communication in all cases to ensure that the correct</td>
<td>Goals of the team supersede any personal goals, resulting in the ability to seamlessly assume the role of leader or follower, as needed; creates a high-functioning team de novo or joins a poorly functioning team and facilitates improvement, such that team goals are met</td>
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<td>recognition) above pursuit of team goals</td>
<td>message sent and the message received in all cases</td>
<td>message is understood by all; seeks out and takes on leadership roles in areas of expertise and makes sure the job gets done</td>
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ICS3. Act in a consultative role to other physicians and health professionals

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<td>Actively participates as a member of the consultation team and can</td>
<td>Identifies self as a member of the consultation team; can accurately</td>
<td>Identifies self as an integral member of the consultation team based</td>
<td>Identifies self as an expert in his or her discipline based on advanced</td>
<td>Identified by self and others as a master clinician who effectively</td>
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<td>present the patients' history and physical findings, scribe recommendations, and document them in the medical record; lack of discipline-specific knowledge limits ability to focus the data gathering and presentation to those details relevant to the question asked</td>
<td>gather and present the patient's history and physical findings with a focus on those details pertinent to the question asked; demonstrates increased discipline-specific knowledge and an ability to filter and prioritize information that lead to a more focused (although not comprehensive), differential, realistic working diagnosis; makes tempered by recognition of limitations in others, leading to pursuit of new knowledge; independently assesses and confirms data; combination of past experience and ability to use information technology to seek new knowledge allows for recommendations that are consistent with best practice; develops good understanding of the strength of the evidence on which recommendations are based; develops and maintains a collaborative approach to consultation; answers to all but the most difficult diagnostic dilemmas are intuitive, leaving most mental energy available for reinvestment in ongoing clinical, educational, and/or research contributions to the field</td>
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<td>more specific recommendations; and more succinct documentation; takes more &quot;ownership&quot; of the patients' outcomes during follow-up of initial recommendations</td>
<td>relationships with referring providers, but may not encourage the bidirectional feedback that makes the relationship truly collaborative</td>
<td>relationship with the referring providers that maximizes adherence to recommendations and supports continuous bidirectional feedback</td>
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