VANDERBILT
School of Medicine

FELLOWSHIP TRAINING PROGRAM
ADULT CARDIOVASCULAR MEDICINE

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SECTION I
MISSION STATEMENT

Our program aims to inspire fellows to become leaders in the expanding cardiovascular medicine community. Our mission is to train outstanding physicians and physician-scientists with a solid foundation in clinical care, teaching, research, and leadership.

We value in our faculty and fellows:

- Clinical excellence
- Scholarship
- Academic achievement
- Dedication
- Integrity
- Service
- Leadership

SECTION II
PROGRAM DESCRIPTION

Adult Cardiovascular Medicine is an increasingly complex and expanding discipline. The training program at Vanderbilt continually evolves to meet the most current training requirements. Our program is designed to provide training and experience in the evaluation and management of a wide spectrum of patients with acute and chronic cardiac conditions. The mandated clinical experience conforms to the American College of Graduate Medical Education guidelines (www.acgme.org).

All Cardiovascular Medicine Fellows will participate in clinical activities for at least 24 months during the 3-year training period as outlined by the ACGME and ABIM. This allows fellows to develop appropriate levels of clinical competence in Adult Cardiovascular Medicine to start their careers. The training program also actively participates in physician-scientist training via the ABIM research pathway and adheres to the guidelines outlined by the ABIM (www.abim.org). The program has an NIH T32 training grant which allows the support of fellows seeking additional dedicated research training as well. The total amount of clinical training will be individually determined to best meet the career goals of fellows. The content of training and level of training a fellow achieves is based on the American College of Cardiology Core Cardiology in Adult Cardiovascular Medicine (COCATS) requirements.

(COCATS 4 http://www.onlinejacc.org/content/65/17/1724?_ga=1.210353302.267119998.1487333634)

At the end of cardiology fellowship, trainees receive letters from the supervising heads of cardiology specialties attesting to their level of training. Fellows are asked to keep a personal log of their procedures, as well as the number of months completed in specialty.

The fellowship rotations are based upon a 28-day cycle. Each 28-day block rotation requires fellows to switch on a staggered cycle from attendings and housestaff, and we believe this improves the continuity of care provided to our patients. This cycle allows an increase in the number of rotations in a calendar year and more elective-based experiences during fellowship.
SECTION III
PROGRAM CLINICAL EXPERIENCES

Please see the cardiology fellowship website for more detailed descriptions of the rotation responsibilities, learning objectives, and curriculum

AMBULATORY CARDIOLOGY

1. General cardiology clinic
Fellows are involved in longitudinal care of patients in the ambulatory setting throughout their 3-year fellowship as required by ACGME. These activities take place at the Vanderbilt Heart and Vascular Institute (VHVI), in the outpatient clinic of the Raphael Smith Cardiology Center at the Nashville Veteran’s Affairs Medical Center (VA), at Nashville General Hospital at Meharry Medical College (Meharry), or at Siloam Health Center. These locations all ensure exposure to a broad mix of patients and cardiovascular diseases. The ambulatory experience teaches management of the full range of cardiovascular diseases seen in ambulatory patients. Fellows are encouraged to function as independently as is appropriate for the level of training with faculty supervision.

2. Subspecialty clinic
Fellows obtain additional outpatient subspecialty experience during certain rotations, as well as during the second and third years of training. This experience includes Heart Failure/Transplant, Vascular Medicine, Adult Congenital Heart Disease, Lipid Management, and Electrophysiology.

INPATIENT CARDIOVASCULAR MEDICINE

1. Electrophysiology Inpatient Consultation
The Heart Rhythm Service provides consultation to the VUMC inpatient and Emergency Department (ED) services. This includes evaluation of implanted pacemakers, defibrillators and loop recorders with the assistance of device nurses and technicians. There is also an opportunity to see arrhythmia patients in the outpatient setting and to spend time in the Electrophysiology Laboratory participating in procedures.

2. Cardiovascular Intensive Care Unit Rotation
The Cardiovascular Intensive Care Unit (CVICU) at Vanderbilt is a 27-bed ICU for cardiology and cardiac surgery patients. The CVICU rotation entails care of critically ill cardiology patients, including the use of mechanical assist devices.

3. Inpatient Consults
The Inpatient Consult Service performs cardiovascular consultation for the VUMC non-cardiology inpatient ward services and for the ED.

4. Heart Failure Inpatient Services
The Heart Failure Services provide inpatient and consultative care for patients with advanced heart failure, mechanical assist devices and cardiac transplant. These rotations allow fellows to participate in management of heart failure, pre- and post-transplant care, and ventricular assist devices. Fellows will also have the opportunity to see outpatients with chronic advanced heart failure and gain experience with hemodynamic exercise testing and cardiopulmonary exercise testing.

5. Vascular Medicine Service
The Vascular Medicine Service provides inpatient consultative services at VUMC for patients with vascular disease. The fellow also has the opportunity to see patients with vascular disease in the outpatient vascular medicine and vascular surgery clinics and to interpret noninvasive vascular studies. An opportunity to participate in specialty clinics other than cardiovascular medicine during this rotation is also available, including pulmonary hypertension, hematology and vasculitis clinics.

6. Veterans’ Affairs Medical Center Rotations
The Veterans' Affairs Medical Center (VA) in Nashville on the Vanderbilt campus consists of a 233-bed general hospital and an ambulatory care, education, and research facility. Fellows participate in three rotations at the VA.

- **VA CCU:** The CCU fellow participates in daily management decisions of critically ill cardiology patients. The fellow also has the opportunity to perform Transesophageal Echocardiography (TEE) on VA inpatients and outpatients.
- **VA Consult Service:** The VA consult service provides consultative services to VA inpatients.
- **VA Catheterization Lab:** The VA cath lab performs cardiac catheterization procedures for VA inpatients and outpatients.

7. **Nashville General Hospital at Meharry**
Nashville General is the public access hospital for Nashville and Davidson County. It is a primary source of healthcare delivery for the underserved and indigent population in this region and provides a diverse clinical experience for fellows. This rotation entails a combination of inpatient consults, cardiac catheterization, and noninvasive imaging.

**CARDIOVASCULAR LABORATORY ROTATIONS**

1. **Cardiac Catheterization**
   Vanderbilt’s cardiac catheterization laboratory performs more than 3000 catheterizations and 1500 interventions annually, drawing upon an extensive referral base throughout middle Tennessee. Fellows have the opportunity to participate in and perform a comprehensive range of invasive catheterization procedures for both inpatients and outpatients.

2. **Echocardiography**
   The VUMC Echocardiography Laboratory is a high volume laboratory, which provides training for fellows in transthoracic echocardiography, transesophageal echocardiography (TEE), stress echocardiography and structural echocardiography.

3. **Cardiovascular MRI**
   The Cardiovascular MRI Laboratory provides services for inpatient and outpatient cardiac and vascular MRI. Fellows are instructed on MRI safety procedures, image acquisition, image manipulation, and image interpretation.

4. **Nuclear Cardiology**
   Nuclear cardiology training occurs jointly by cardiology and radiology. Exposure to outpatient-based nuclear cardiology testing occurs during the Imaging rotation in the Vanderbilt Heart and Vascular Institute. Inpatient nuclear cardiology is performed on the Nuclear Cardiology rotation with the Division of Nuclear Medicine in the Department of Radiology and Radiological Sciences. Fellows are instructed on nuclear safety procedures and isotope properties and handling, performance of exercise and pharmacological stress testing, image acquisition and processing, and image interpretation.

5. **Cardiac CT**
   Inpatient and outpatient cardiac CT is performed in the Department of Radiology and Radiological Services at VUMC. Fellows have the opportunity to learn CT safety procedures, image acquisition and manipulation, and image interpretation.
SECTION IV
ADVANCED TRAINING

The following advanced training programs are available for fellows who have completed general cardiovascular fellowship training.

**Cardiac Transplantation/Advanced Heart Failure**
The Cardiac Transplant/Advanced Heart Failure Fellowship is a one year program designed to provide comprehensive training in the management of patients with advanced heart failure, ventricular assist devices, and cardiac transplantation. The fellow is also an integral member of the Cardiac Heart Failure/Transplant Service and is involved in early and late medical management of transplant recipients, both in hospital and in the ambulatory setting.

**Cardiac Electrophysiology**
The Clinical Electrophysiology Fellowship provides two years of training in the diagnosis and management of complex cardiac rhythm disturbances. This training includes the performance and interpretation of electrophysiology studies; the performance of radiofrequency catheter ablation procedures; and the evaluation and implantation of permanent pacemakers and implantable cardioverter defibrillator and biventricular pacing device systems.

**Interventional Cardiology**
The Interventional Cardiology Fellowship provides one year of training in invasive and interventional cardiovascular medicine.

**Invasive Peripheral Vascular and Structural Heart Disease**
After completion of one year of advanced training in Interventional Cardiology an additional year of training is available in peripheral vascular interventions and structural heart disease. It is possible to gain advanced training in the percutaneous management of carotid stenosis, patent foramen ovale/ASD, HOCM, valvular disease, complex peripheral vascular disease and circulatory failure.

**Adult Congenital Heart Disease**
The ACHD Training Program provides one year of advanced training in the diagnosis and management of adults with congenital heart disease. This program involves training and collaboration with both ACHD and pediatric cardiology faculty.

**Vascular Medicine**
The Brown Family Fellowship in Vascular Medicine is a one year program designed to provide comprehensive training in vascular medicine. Fellows will participate in outpatient and inpatients vascular medicine services, rotations in vascular imaging, and collaboration with vascular surgery.

**Cardio-Oncology**
The Cardio-Oncology Training Program provides specialty training in the diagnosis and management of patients with cardiovascular disease in the setting of oncological disorders. This program provides 1-2 years of clinical and research training.
SECTION V
RESEARCH AND SUPPLEMENTAL EDUCATIONAL CURRICULUM

Research: A wide variety of basic, translational and clinical research experiences are available to the fellow within the Division of Cardiovascular Medicine and in related areas. We expect that during training, each fellow will participate in a research project to gain expertise in one or more research techniques. It is expected that by the end of fellowship a fellow will learn how to acquire and analyze data, understand its significance, and how to present it clearly. There are multiple conferences designed to equip fellows with fundamental skills to successfully complete a research project, including 2 weeks of intensive Introduction to Research during the first year of fellowship. In addition, fellows are encouraged to attend working research conferences, including the Cardiovascular Research Series, to enhance understanding of ongoing research, research techniques, statistics, and interpretation of literature. Please see the Research Curriculum outlined on the fellowship website for further details.

Division, faculty, or NIH Training Grant (T32, HL#007411-26) funds support all fellows engaged in research training during clinical fellowship.

Mandatory Weekly Conferences
- **Cardiology Grand Rounds** is a one-hour weekly conference presented by experts on a wide variety of cardiovascular diseases at both the clinical and basic science level. Topics vary from week-to-week but all sessions are designed to enhance basic understanding of disease processes, diagnosis and therapeutics. All fellows give Cardiology Grand Rounds at least once during fellowship.
- **Clinical Management Conference** is a one-hour weekly conference designed to address clinical management problems in cardiovascular medicine and discuss best evidence based diagnostic and treatment options using a case-based approach.
- **Morbidity and Mortality Conference** is held monthly to allow faculty and fellows to assess complications and unanticipated outcomes and identify areas for improvement.

Subspecialty Conferences: These conferences are dedicated to provide the trainee with a more intensive educational experience within cardiovascular subspecialties. Fellows currently participating in these rotations are strongly encouraged to attend.

- Echocardiography and Multimodality Imaging
- Adult Congenital
- Arrhythmia
- Interventional
- Heart Failure
- Nuclear Medicine

Journal Club: This is a topic directed series that pairs a junior fellow with a faculty member to analyze and present a recently published report that has had a major effect on clinical cardiovascular practice.

Boot Camp: This is an intensive series of lectures given the first two months of cardiovascular training to introduce fundamentals of cardiovascular medicine.

In addition, fellows receive education on:
- Quality Improvement
- Recognition and management of fatigue and sleep deprivation
- Structured hand-over process to facilitate continuity of care and patient safety
- Appropriate methods of obtaining informed consent
- Conscious sedation
- Trainee supervision
- Resources for trainee wellness within the Division and Vanderbilt community
Assessment and Evaluation
Fellows are evaluated on the 6 ACGME core competencies:

- **Patient Care** that is compassionate, appropriate, and effective for the treatment of health problems and the promotion of health.
- **Medical Knowledge** about established and evolving biomedical, clinical, and cognate (e.g. epidemiological and social-behavioral) sciences and the application of this knowledge to patient care.
- **Practice-Based Learning and Improvement** that involves investigation and evaluation of their own patient care, appraisal and assimilation of scientific evidence, and improvements in patient care.
- **Systems-based practice through the** awareness of and responsiveness to the larger context and system of health care, as well as the ability to call effectively on other resources in the system to provide optimal health care.
- **Interpersonal and Communication Skills** that result in effective information exchange and teaming with patients, their families, and other health professionals.
- **Professionalism**, as manifested through a commitment to carrying out professional responsibilities, adherence to ethical principles, and sensitivity to a diverse patient population.

Within each of these competencies, Milestone achievement in particular skills is reported semi-annually for each fellow, as required by the ACGME. These Milestone achievements for each fellow are determined by the Clinical Competency Committee and are informed by rotation evaluations and other feedback from faculty. Evaluations and feedback may also be given by peers, residents, students, staff, and patients. Fellows take the American College of Cardiology In-training exam twice during fellowship, and they receive their individual reports for review. The Fellowship Director or Associate Director will meet with each fellow at least twice each year to review evaluations and in-training scores, discuss strengths, identify areas for improvement, and tailor the training program to best fit individual career goals.

Fellows are given the opportunity to evaluate faculty and to review the training program on an annual basis.

Our training program recognizes the importance of adequate supervision to ensure patient safety and to ensure that trainees learn appropriate clinical decision making. This supervision must be given in a structure that allows appropriate trainee autonomy. The exact degree of guidance provided in each specific situation is influenced by patient safety, severity and complexity of the situation, the PGY level of the fellow, and the demonstrated skill and knowledge of the fellow. The outline of supervision provided to our fellows is described below:

**Direct Supervision:** Direct supervision (the attending physician is physically present with the fellow and the patient) is provided at all times for:

- The cardiac catheterization laboratory, including left heart catheterizations, coronary and peripheral angiography, percutaneous interventions, structural heart disease interventions, intraaortic balloon pump placement, and pericardiocentesis.
- The electrophysiology laboratory for all ablations, permanent device placements, and routine temporary transvenous pacemakers.
- The echocardiography laboratory for all transesophageal echocardiograms and direct current cardioversions.
**Indirect Supervision:** Indirect supervision with direct supervision immediately available (the attending is available immediately and located within the confines of the site of patient care) is provided for:

- All clinical rotations not described above.

Indirect supervision with direct supervision available (the attending is immediately available by phone and is available to arrive within a reasonable period of time to provide direct supervision) is provided for:

- All on call periods and includes procedures performed on call such as central line placement, pulmonary artery catheter placement, and emergency temporary transvenous pacemaker placement.

Our program encourages and expects open communication from both the attendings and the fellows that will facilitate the appropriate level of supervision for any given situation. We encourage the SUPERB/SAFETY model of effective strategies for supervision (Farnan, JM, Strategies for Effective On-Call Supervision for Internal Medicine Residents, *JGME*, March 2010: 46-51).

On each rotation or call night, **the attending should**

- Set expectations for when to be notified, including when the fellow is uncertain about a clinical decision
- Plan a time to be in contact with the fellow and be easily available at all times
- Create an environment that allows the fellow to be unafraid to call and balances supervision with autonomy for the fellow

**The fellows should**

- Seek attending input early, especially when uncertain about clinical decisions or when there are active clinical decisions occurring
- Notify attending’s in all cases of the following: patient death, cardiac arrest, end of life discussions, a patient leaving against medical advice, a patient being transferred to a higher level of care or being discharged, and a significant change in a patient’s clinical status (including the need for escalation of hemodynamic support, need for intubation, and need for invasive procedures).
- Call when assistance is needed navigating the health care system to provide appropriate patient care
SECTION VII
SUPPLEMENTAL INFORMATION AND EXPECTATIONS

Clinical Experience and Education
This is defined as all clinical and academic activities related to the residency program, i.e., patient care (both inpatient and outpatient); administrative duties related to patient care, the provision for transfer of patient care, time spent in-house during clinical and educational activities, clinical work performed off-site, and scheduled academic activities such as conferences. Clinical and educational work does not include reading and preparation time spent away from the clinical and educational site. Our program adheres to all training program requirements (both common and specialty) as outlined by the ACGME. The Program Directors monitor the demands of all clinical experience and education responsibilities and make scheduling adjustments as necessary to mitigate excessive service demands and/or fatigue.

Planned absences from fellowship responsibilities must be approved by the Program Director. In these cases, the Program Directors, the Program Coordinator, the Chief Fellows, and the on-service attending should be notified at least 2 weeks in advance. Each fellow is required to arrange coverage for his/her absence. In emergencies and in the event that a fellow is unable to perform his/her duties, the Chief Fellows and Program Directors help to arrange coverage to ensure continuity of patient care.

On-Call Activities
Fellows take call for 12 months, beginning approximately 2 months after the start of fellowship. On-call responsibilities include providing consultative services to the non-cardiology inpatient ward services at VUMC and the VA and to the ED. The on-call fellow also provides supervision and instruction when necessary to the non-CVICU inpatient cardiology services. Indirect supervision with direct supervision available by faculty is always available for the on-call fellow, and open communication with the supervising faculty is expected and encouraged.

Moonlighting
Because fellowship training is a full-time endeavor, the Program Director must ensure that moonlighting does not interfere with the ability of the fellow to achieve the goals and objectives of the educational program. Our program complies with our institution’s written policies and procedures regarding moonlighting, and moonlighting (both internal and external) must be counted toward the 80-hour weekly. Each individual moonlighting must receive approval from the Program Director and the office of Graduate Medical Education.

Health and Wellness
VUMC offers a variety of integrated services to support fellows as part of the Vanderbilt house staff. The programs include:
- The Vanderbilt Occupational Health Clinic (VOHC)
- Health Plus
- The Work/Life Connections-EAP, including Faculty and Physician Wellness
- The Vanderbilt Child and Family Center

VUMC Graduate Medical Education
Our program adheres to policies as outlined by VUMC GME. Please see this site, including the Vanderbilt House Staff Manual for additional information. http://www.mc.vanderbilt.edu/root/vumc.php?site=gme

Equal Opportunity/Affirmative Action
In compliance with federal law, including the provisions of Title IX of the Education Amendments of 1972 and Sections 503 and 504 of the Rehabilitation Act of 1973, Vanderbilt University does not discriminate on the basis of race, sex, religion, color, national or ethnic origin, age, handicap, or military service in its administration of educational policies, programs, or activities; its admissions policies; scholarship and loan programs; athletic or other University-administered programs; or employment. Inquiries or complaints should be directed to the Opportunity Development Officer, Franklin Building, West Side Row, PO Box 1809, Station B, Nashville, Tennessee 37235. Telephone (615) 322-4705.

Cardiovascular Medicine Fellowship Training Program