

BEAUMONT HOSPITAL SYSTEM
DEPARTMENT OF CARDIOVASCULAR MEDICINE

CARDIOVASCULAR DISEASE FELLOWSHIP

POLICIES, RESPONSIBILITIES AND CURRICULUM
2018 – 2019

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	Director, Clinical Research/Education	Attending Cardiologist
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Medical Director, Echocardiography Lab		
Terry Bowers, MD		Mazen Shoukfeh, MD
Medical Director, Vascular Medicine – Royal Oak	David Haines, MD	Interventional Cardiologist
	Director, Heart Rhythm Center	
Elvis Cami, MD	Ivan Hanson, MD	
Cardiovascular Imaging	Interventional Cardiologist	James Stewart, MD
		Attending Cardiologist
	George Hanzel, MD	
Kavitha Chinnaiyan, MD	Director, Cardiac Cath Lab	
Director, Cardiac CT Research	Director, Structural Heart Disease	Steven Timmis, MD
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Chair, Cardiovascular Medicine	Nathan Kerner, MD	Brian Williamson, MD
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	Clinical Cardiologist	
Barry Franklin, PhD		
Director, Preventive Cardiology & Cardiac Rehab		

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87350

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83850

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82495

Description of the Cardiovascular Disease Fellowship Training Program

I. Educational Program

The Cardiovascular Disease Fellowship Training Program at Beaumont Hospital is organized to provide training and supervised experience in the evaluation and management of a wide variety of patients with acute and chronic cardiovascular conditions including coronary artery disease, congestive heart failure, arrhythmias, acute myocardial infarction, acute ischemic syndromes, lipid disorders, hypertension, cardiomyopathy, valvular heart disease, pulmonary heart disease, peripheral vascular disease, inflammatory heart disease, and adult congenital heart disease. The training and experience will exceed ACGME requirements for the fellow to acquire the competency of a cardiovascular specialist. The program is 3 years in duration.

II. Key Clinical Faculty

The key institutionally based faculty members (“key” as defined by the ACGME, not by our commitment to the training program) include the Program Director and other institutionally-based faculty members as follows:

Michael Gallagher, MD	Director, Cardiovascular Disease Fellowship
Robert Safian, MD	Director, Interventional Cardiology Fellowship
	Director, Center for Innovation and Research (CIRC)
Amr Abbas, MD	Interventional Cardiologist
Steven Almany, MD	Med Dir Innovative Technologies & Prog Development, Med Dir Anticoagulation Management Service
Aaron Berman, MD	Clinical Chief, Cardiovascular Medicine - Royal Oak
A. Neil Bilolikar, MD	Medical Director, Echocardiography Lab
Kavitha Chinnaiyan, MD	Director, Cardiovascular Imaging Education
Simon Dixon, MBChB	Chair, Cardiovascular Medicine, Co-Director Cardiology Research
Darlene Fink, MD	Director, Nuclear Medicine
James Goldstein, MD	Director, Clinical Research/Education
David Haines, MD	Director, Heart Rhythm & EP Labs
George Hanzel, MD	Director, Cardiac Cath Lab & Percutaneous Valve Program
Nathan Kerner, MD	Attending Cardiologist
Dominic Marsalese, MD	Director, Chest Pain Emergency Service Associate Director, Interventional Cardiology Fellowship Program
Gil Raff, MD	Director, Cardiac MRI/CT
James Stewart, MD	Attending Cardiologist
Steven Timmis, MD	Director, Cardiac Coronary Care Unit
Brian Williamson, MD	Director, EP Fellowship

III. Facilities and Resources

Modern facilities to accomplish the overall educational program are available in the Heart Center and at Beaumont Hospital. These include inpatient care; ambulatory care; research resources; laboratories for hemodynamics, angiography, percutaneous transluminal coronary angioplasty, invasive electrophysiologic studies, and other interventional procedures; electrocardiography; ambulatory electrocardiogram (ECG) recording; exercise testing; echocardiography (including Doppler and transesophageal studies), cardiac and vascular MRI; cardiac and vascular CT; radionuclide imaging; facilities for assessment of peripheral vascular disease and pulmonary physiology; intensive cardiac care unit, a medical intensive care unit, a cardiac surgery intensive care unit, and a general surgical intensive care unit; resources for implantation of pacemakers, implantable cardioverter/defibrillator, and follow-up; and active cardiac surgery.

IV. Specific Program Content

The goal of the training program is to provide opportunities for the fellows to develop clinical competence in the field of adult cardiovascular disease.

A. Clinical Experience

1. Specific Clinical Training

There are at least 24 months of clinical training, including inpatient and specific clinical experiences:

- a. Four months in the cardiac catheterization laboratory
- b. Six months in noninvasive cardiac evaluations, including:
 1. three months of surface echo, stress echo, and TEE
 2. two months of nuclear cardiology
 3. one month of exercise stress testing and formal interpretation of ECG and ambulatory ECG recording
- c. One month devoted to invasive electrophysiology, pacemaker follow-up and ICDs.

2. Inpatient Experience

There are at least 8 months of non-laboratory clinical practice activities including:

- a. Three months of CCU
- b. 2 months of clinical consultative electrophysiology
- c. 3 months of general cardiology inpatient and consultative service

B. Technical and Other Skills

1. The program will provide sufficient experience for the fellow to acquire skill in the performance and interpretation of:

- a. history and physical examination
- b. basic and advanced cardiac life support
- c. elective cardioversion and pacemaker implantation
- d. right heart catheterization
- e. left heart catheterization and coronary arteriography
- f. exercise stress testing
- g. echocardiography (surface and transesophageal studies)
- h. pericardiocentesis
- i. programming and follow-up surveillance of permanent pacemakers and ICDs
- j. cardiovascular rehabilitation

2. The program will provide opportunities for fellows to acquire experience in the performance and interpretation of:

- a. intracardiac electrophysiologic studies
- b. intra-aortic balloon counterpulsation
- c. percutaneous transluminal coronary angioplasty and other PCI

3. The program will provide sufficient experience for fellows to acquire skill in the interpretation of :

- a. chest x-rays
- b. a minimum of 3500 electrocardiograms
- c. a minimum of 75 ambulatory ECG recordings
- d. radionuclide studies of myocardial function and perfusion
- e. cardiovascular literature

C. Formal Instruction

The program provides formal instruction in:

1. Basic science, including
 - a. cardiovascular anatomy

- b. cardiovascular physiology
 - c. cardiovascular metabolism
 - d. molecular biology of the cardiovascular system
 - e. cardiovascular pharmacology, including drug metabolism, adverse effects, indications, the effects on aging, relative costs of therapy, and the effects of non-cardiovascular drugs upon cardiovascular function
 - f. cardiovascular pathology
2. Prevention of cardiovascular disease, including
 - a. epidemiology and biostatistics
 - b. risk factor modification
 - c. lipid disorders
 - d. management of obesity
 3. Evaluation and management of patients with
 - a. coronary artery disease, its manifestations and complications
 - b. arrhythmias
 - c. hypertension
 - d. cardiomyopathy
 - e. valvular heart disease
 - f. pericardial disease
 - g. pulmonary heart disease, including pulmonary embolism
 - h. peripheral vascular disease
 - i. cerebrovascular disease
 - j. heart disease in pregnancy
 - k. adult congenital heart disease
 - l. cardiovascular trauma
 4. Management of
 - a. acute and chronic congestive heart failure
 - b. acute myocardial infarction and other acute ischemic syndromes
 - c. acute and chronic arrhythmias
 - d. preoperative and postoperative patients
 - e. cardiac transplant patients
 - f. geriatric patients with cardiovascular disease
 5. Diagnostic imaging techniques, including
 - a. magnetic resonance imaging
 - b. fast computed tomography
 - c. positron emission tomography
 6. Other areas of importance to patients and physicians:
 - a. professionalism
 - b. physician fatigue and impairment
 - c. risk management
 - d. cost effectiveness
 - e. end-of-life care
 - f. cultural and humanistic issues

D. Other Learning Strategies

1. Reading Lists

Fellows are strongly advised to maintain a program of regular reading, using a variety of on-line resources that are available without charge through the Beaumont library and internet. All fellows should read the joint ACC/AHA guidelines on various topics, and are readily available from the ACC website and from

Cardiosource.com. These guidelines are updated on a regular basis, and provide useful clinical information as well as excellent summaries of the base of evidence that supports best clinical practice.

2. Harvey Heart model
This is a superb teaching tool for learning skills for cardiac auscultation.
3. Simulation training
We are evaluating the potential for incorporating simulators into training for invasive procedures.
4. Participation in departmental quality assurance and other committee activities.

**POLICIES OF THE DEPARTMENT OF CARDIOVASCULAR
MEDICINE FELLOWSHIP TRAINING PROGRAM**

Compact between Cardiology Fellows and Teaching Faculty

Fellowship is an integral component of the formal education of physicians. To practice medicine independently, physicians must receive a medical degree and complete a supervised period of training in a specialty area. To meet their educational goals, fellows must participate actively in the care of patients and must assume progressively more responsibility for that care as they advance through their training. In supervising education, faculty must ensure that trainees acquire the knowledge and special skills of their respective disciplines while adhering to the highest standards of quality and safety in the delivery of patient care services. In addition, faculty members are charged with nurturing those values and behaviors that strengthen the doctor-patient relationship and that sustain the profession of medicine as an ethical enterprise.

Core Tenets of Education

Excellence in Medical Education

Beaumont Hospital System, Oakland University William Beaumont School of Medicine, the Department of Cardiovascular Medicine, the Cardiovascular Disease fellowship training programs, and the entire teaching faculty are committed to maintaining the highest standards of educational quality. Accordingly, the fellows' educational needs are the primary determinants of the training program. Fellows must remain mindful of their oath as physicians and recognize that our responsibilities to our patients always take priority over purely educational considerations.

Highest Quality Patient Care and Safety

The primary obligation of Beaumont Health System and the Department of Cardiovascular Medicine is to provide high quality care to our patients, ensuring the highest standards of safety. By allowing fellows to participate in the care of our patients, teaching faculty accept an obligation to ensure high quality medical care in all learning environments.

Respect for Well-Being

Fundamental to the ethic of medicine is respect for every individual. Given the uncommon stresses inherent in fulfilling the demands of our training program, fellows will be allowed sufficient opportunities to meet personal and family obligations, to pursue recreational activities, and to obtain adequate rest.

Commitments of Cardiovascular Teaching Faculty

1. As role models, we will maintain the highest standards of care, respect the needs and expectations of patients, and embrace the contributions of all members of the healthcare team.
2. We pledge to ensure that all components of the educational program are of high quality, including our own contributions as teachers.
3. In fulfilling our responsibility to nurture both the intellectual and the personal development of residents and fellows, we commit to fostering academic excellence, professionalism, cultural sensitivity, and a commitment to maintaining competence through life-long learning.
4. We will always demonstrate respect for people as individuals, without regard to gender, race, national origin, religion, disability or sexual orientation, and we will cultivate a culture of tolerance among the entire staff.
5. We will ensure that fellows have opportunities to participate in patient care activities to become competent in all aspects of cardiovascular care, and we will minimize those activities that have little or no educational value.

6. We will provide fellows with opportunities for progressive responsibility and recognize when they should seek assistance from colleagues.
7. In fulfilling the responsibility, we have to our patients, we will ensure that fellows receive appropriate supervision for all care provided during their training.
8. We will evaluate each fellow's performance on a regular basis, provide appropriate verbal and written feedback, and document achievement of the competencies required to meet all educational objectives.
9. We will ensure that fellows have opportunities to participate in important teaching activities, including conferences and other non-patient care experiences. We will strongly support and encourage fellows to engage in activities that promote a life-long commitment to self-directed learning.
10. We will encourage and support fellows in their roles as teachers of residents and medical students.

Commitments of Cardiovascular Fellows

1. We acknowledge that our most important obligation as physicians is to protect our patients' welfare; quality health care and patient safety will always be our prime objectives.
2. We will strive to acquire the knowledge, clinical skills, attitudes and behaviors that are required to fulfill all objectives of the educational program and to achieve the competencies deemed appropriate for the practice of cardiology.
3. We embrace the professional values of honesty, compassion, integrity, and dependability.
4. We will adhere to the highest standards of the medical profession and pledge to respect all patients and members of the health care team without regard to gender, race, national origin, religion, economic status, disability or sexual orientation.
5. As fellows, we learn most from being directly involved in patient care, and from the guidance of faculty and other members of the healthcare team. We recognize the importance for faculty supervision of our clinical activities.
6. We accept our obligation to obtain assistance from faculty or other experienced individuals when we are confronted with high-risk situations or with difficult clinical decisions.
7. We welcome candid and constructive feedback from faculty and others, recognizing that such assessments are useful for improving our skills.
8. We will provide candid and constructive feedback on the performance of our colleagues, students, and faculty, recognizing our obligation to participate in peer evaluation and quality improvement.
9. We are committed to life-long learning to improve our skills and medical knowledge, and to prepare ourselves to maintain our expertise and competency throughout our professional careers.
10. We pledge to assist students, residents and other fellows in meeting their professional obligations by serving as teachers and role models.

POLICIES REGARDING FELLOW SELECTION, PROMOTION, DISCIPLINE, AND DISMISSAL

I. Selection of Fellows

Fellows are selected from the pool of eligible applicants, based on meritorious accomplishments. An applicant is eligible for consideration if he/she is a graduate of a Liaison Committee on Medical Education (LCME) accredited medical school or is a student in good standing of such a school with expected graduation anticipated before the start of the fellowship. For international medical graduates, the Educational Commission for Foreign Medical Graduates (ECFMG) must provide appropriate certification. Information for applicants is published annually on the hospital's web site. To be considered for fellowship, the applicant must furnish a typed application, three (3) letters of recommendation, and the Chairman's letter. The application must include United States Medical Licensing Examination (USMLE) transcripts. In the recent past, more than 500 residents per year apply to the Cardiology Fellowship Training Program, and 30 are invited for interviews. Several faculty members will interview the applicants, evaluate the entire application, and assign a score. At the conclusion of the interview "season", the teaching faculty will convene to review all applicants and develop a rank order for the Fellow Residency Matching Program (FRMP). The program director will assemble the rank list after obtaining input from the teaching faculty. There are 4 fellowship positions each year, and all are filled by the FRMP.

II. Promotion of Fellows

This document contains a detailed curriculum and objectives for all rotations and activities. Satisfactory fulfillment of the program's requirements is essential. Fellows who fulfill all clinical, technical and professional expectations will be promoted to the next PGY level or graduated. Fellows who fail to meet these requirements will be identified as early as possible in the academic year, counseled, alerted to the possibility of contract non-renewal, and subject to remediation, probation or other appropriate actions (see Fellow Dismissal).

III. Graduation Requirements

All cardiology fellows are required to meet all of the following criteria for graduation:

1. Satisfactory completion of all clinical rotations.
2. Completion of at least one manuscript for submission to a peer-review journal. Abstracts alone do not satisfy this requirement.
3. One abstract (minimum) must be submitted to Beaumont Research Institute for the Annual Resident's and Fellow's Research Forum Day.
4. Satisfactory completion of the cardiology in-service examination, which will be given on a yearly basis. This in-service examination which will include general clinical cardiology and questions pertinent to the specific clinical rotations.
5. Documentation and maintenance of a complete procedure log (see below).

Note: Letters of recommendation, completion of forms for hospital privileges and certification of completion of fellowship training will not be given until all requirements have been completed.

IV. Graduation Ceremony

The Department of Cardiovascular Medicine and Beaumont Hospital provide enormous support to fellowship teaching and education. Although not a formal requirement for graduation, all fellows (especially graduating fellows) are expected to attend their graduation ceremonies, as a sign of respect, courtesy, and gratitude. The Department ceremony recognizes all graduating Cardiology Fellows (clinical, interventional, EP, imaging), and usually occurs on the second or third weekend in June.

V. Fellow Discipline

Unsatisfactory fellow performance or misconduct may result in the need for remediation or disciplinary actions. If such an action is considered by the Program Director, the Director of Medical Education will be informed immediately of the details of the situation. The Program Director and the Director of Medical Education will jointly determine the need for the extent of the remedial or disciplinary action. The fellow will be notified in writing of the planned action, its justification, the length of action, and the conditions of performance or conduct by which the action will be terminated, extended, or result in a consideration for dismissal from the program.

VI. Dismissal of Fellows

In the event that remedial action or counseling is unsuccessful (see Fellow Promotion), temporary suspension or termination may be deemed appropriate. If the Program Director plans to deny reappointment or advancement, the fellow will be notified as early in the year as practical to allow remedial action or counseling. The fellow will be alerted to this possibility no later than the sixth month of the contract year, with appropriate notification and documentation to the Director for Medical Education. Notification of the fellow and the Director of Medical Education will be accomplished in writing. If there is no significant improvement by the end of the eighth month of the contract year, the Program Director will make the final determination. A hearing will convene within 14 days, if requested by the fellow. The Medical Director will appoint a Hearing Committee of at least 5 individuals (4 program directors who have not participated in deliberations about the fellow, and a fellow or faulty person chosen by the suspended or terminated fellow). One committee member shall be designated by the Medical Director to act as chairperson. The deliberations of the Hearing Committee will be recorded and a recommendation will be submitted to the Director of Medical Education within three working days after final adjournment of the hearing. The Director of Medical Education will review the deliberations and make a final decision. All variances to this policy will be explained in writing to the Director for Medical Education and the Education Committee at Beaumont Hospital.

VII. Criminal History and Background Check

Fellows who are accepted in the Program must comply with state law requiring a statement of criminal history, and submission to finger printing.

POLICIES REGARDING EVALUATION OF FELLOWS, FACULTY, CURRICULUM, AND GRADUATES

I. Evaluation of Fellows

Formative Evaluation

- a. The Program Director and the Department of Cardiovascular Medicine have procedures for evaluating and documenting the clinical and technical competence of the cardiology fellows. These procedures include observation, assessment, and substantiation of fellows' cognitive and specialized skills and medical care. Medical care includes advanced skills in history-taking, physical examination, clinical judgment, management, consultation, and the ability to critically analyze clinical situations and make medical decisions. The program also evaluates fellows' technical proficiency, teaching skills, communication skills, humanistic qualities, professional attitudes and behavior, and commitment to scholarship. All fellow are evaluated in the context of the six core competencies Interpersonal and Communication Skills, Medical Knowledge, Patient Care, Practice-Based Learning Improvement, Professionalism, and System-Based Practice, using a 360-degree process (fellow evaluation of his/her performance; fellow evaluation by another fellow; fellow evaluation by medical residents and/or students; fellow evaluation by an attending; fellow evaluation by technical and/or nursing staff; fellow evaluation by patient)
- b. Fellows must maintain a procedure log to demonstrate experience with invasive and noninvasive procedures. This log must state the patient's name, date, type of procedure, supervising attending, the indications, and complications. Such records must include sufficient detail to permit use in future credentialing. All fellows must maintain these data in an Excel spreadsheet in compliance with specifications established by the Program Director. See the Fellowship Coordinator for details. At the completion of the academic year, the Medical Director of the appropriate service will sign a letter of certification for these procedures. This letter will be co-signed by the Program Director, and a copy will reside in the fellows' files.
- c. Regular and meaningful feedback to fellows about their performance is essential to their continuing growth and development as cardiologists. There will be monthly evaluations of all fellows' knowledge, skills, professional attitudes, scholarship, and overall performance. These evaluations will be performed using a web-based system (New Innovations), and copies of these evaluations will automatically be transmitted back to the fellow and to the Program Director.
- d. Fellows will be evaluated after completion of each rotation and their performance will be reviewed with them by face-to-face meeting with the attending physician, if possible. Evaluations will be designed to correlate with the six core competencies, as outlined specifically for each rotation in the curriculum.
- e. The Clinical Competency Committee (CCC) is appointed by the Program Director, and will consist of the Medical Directors of the various sections within the Department of Cardiovascular Medicine. The CCC will review, recommend, and approve all fellows' evaluations on a semi-annual basis. All fellows should understand that their monthly evaluation of their rotations is only one factor that is used to guide the final semi-annual evaluation, and mere completion of a rotation is a minimum requirement. Other important considerations for the CCC and Program Director include attendance and participation in conferences, professionalism, communication skills, evaluations by nursing staff and residents, patient evaluations, and the Beaumont Standards.
- f. The program director will provide structured feedback to the fellow on a semi-annual basis. This feedback will always include a face-to-face meeting and a written summary signed by the Program Director and the fellow. Counseling and other interventions are handled by the Program Director as needed.
- g. Complete records of evaluation and counseling will be maintained for each fellow. Such records will be available in the fellows' file and will be accessible to the fellow on a semiannual basis.

II. Summative Evaluation

- a. The Program Director will prepare a written evaluation of the clinical competence of each fellow at least annually and at the conclusion of the training program. Such evaluations will include the degree to which the fellow has mastered clinical competence, clinical judgment, medical knowledge, clinical skills, humanistic qualities, professional attitudes and behavior, research and scholarship, medical care and technical proficiency in all procedural skills identified in the cardiology fellowship curriculum. The Program Director will verify whether the fellow demonstrates the professional ability to practice competently and independently by the end of the training program.
- b. All records of evaluations will be maintained in the program files to substantiate future hospital credentialing, board certification, and licensing.
- c. Fellows will be advanced to positions of higher responsibility only on the basis of satisfactory completion of their clinical, academic, and administrative responsibilities and professional growth. In the event of an adverse evaluation, fellows will have the opportunity to appeal. There is a written policy to ensure academic due process, to provide fairness to the fellow and protect the institution and patients. This process ensures accurate, proper, and definitive resolution of disputed evaluations (see below).

III. How to Appeal a Negative Evaluation

First, the fellow must speak with the attending physician to formally review the evaluation and resolve any misunderstandings. If this does not resolve the issue, the evaluation can be appealed in the following way: The fellow must write a letter to the Program Director, indicating the desire to appeal the evaluation. The letter should include the rotation, month of service, a description of the issue and rationale for appeal, and what the fellow expects out of the appeal process. The Program Director will resolve the issue by communicating with the fellow and attending physician. In some cases, the Program Director may decide to convene an independent committee to resolve the issue. The committee will consist of the Program Director, the Chief Fellow, and the medical director of the specific rotation.

IV. Evaluation of Faculty Members and Program

- a. The educational effectiveness of the program will be evaluated in a systematic manner. Specifically, the quality of the curriculum and the extent to which the educational goals and objectives have been met by fellows will be assessed annually by the Program Director and Program Evaluation Committee (see next pages). Written evaluations by fellows will be utilized in this process on a semiannual basis, utilizing the “RRC for Internal Medicine Cardiovascular Disease Resident Questionnaire.”
- b. The faculty will have annual meetings to review the goals, objectives, and effectiveness of the program, which will be reviewed by the Program Evaluation Committee.
- c. The Chief Fellow(s) will participate in all reviews of the training program and curriculum.
- d. The faculty will annually evaluate the utilization of resources, the contribution of each institution, the financial and administrative support, the volume and variety of patients, the performance of the faculty, and the quality of fellow supervision.
- e. Fellows will evaluate the faculty on a monthly basis after each rotation using a web-based system (New Innovations). The results of these evaluations will be used for faculty counseling.
- f. Evaluation of faculty performance will be performed on an annual basis with the Program Director and/or Chairman of Cardiovascular Medicine.

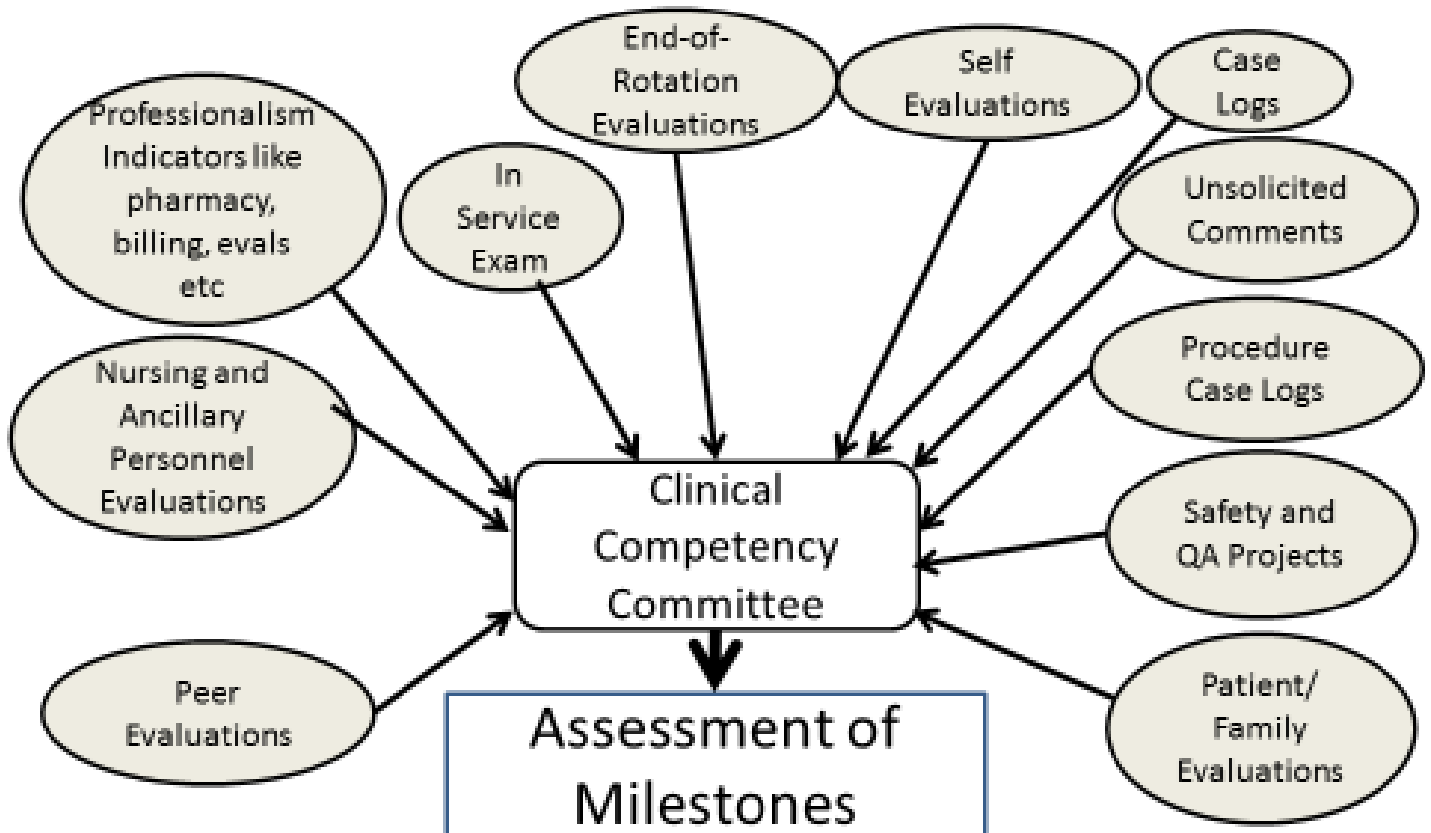
V. Evaluation of Graduates

The Department of Cardiovascular Medicine maintains a system of evaluation of its graduates, for feedback on demographic and practice profiles, licensure and board certification, the graduates’ perceptions of the relevancy of training to career pathways, suggestions for improving the training, and ideas for a new curriculum. The format for

evaluation is by a written survey that is mailed 1 year and 5 years after graduation. These data are used to ensure that the program's goals are being met.

Evaluations are completed using the following components along with other important considerations for the CCC and Program Director include attendance and participation in conferences, professionalism, communication skills, evaluations by nursing staff and residents, patient evaluations, and the Beaumont Standards.

Clinical Competency Committee (CCC)



Beaumont Health System
Graduate Medical Education

Policy: Program Evaluation Committee and the Annual Program Evaluation

Effective Date: July 2013

Purpose: To establish the composition and responsibilities of the Program Evaluation Committee, and to establish a formal, systematic process to annually evaluate the educational effectiveness of the Cardiovascular Disease Fellowship Program curriculum, in accordance with the program evaluation and improvement requirements of the ACGME and the Beaumont Health System GMEC.

Policy: Each ACGME accredited residency/fellowship program will establish a Program Evaluation Committee to participate in the development of the program's curriculum and related learning activities, and to annually evaluate the program to assess the effectiveness of that curriculum, and to identify actions needed to foster continued program improvement and correction of areas of non-compliance with ACGME standards.

Procedure:

Program Evaluation Committee

1. The Program director will appoint the Program Evaluation Committee (PEC).
2. The PEC will be composed of at least two members of the fellowship program's faculty, and include at least one fellow (unless there are no fellows enrolled in the program). The PEC will function in accordance with the written description of the responsibilities listed below.
3. The PEC will participate actively in:
 - a. planning, developing, implementing, and evaluating all significant activities of the fellowship program;
 - b. reviewing and making recommendations for revision of competency-based curriculum goals and objectives;
 - c. addressing areas of non-compliance with ACGME standards and,
 - d. reviewing program annually, using evaluations of faculty, fellows, and others, as specified below.

Annual Program Evaluation

The program, through the PEC, will document formal, systematic evaluation of the curriculum at least annually, and will render a full, written, annual program evaluation (APE).

1. The annual program will be conducted on or about June of each year, unless rescheduled for other programmatic reasons.
2. Approximately two months prior to the review date, the Program Director will:
 - a. facilitate the Program Evaluation Committee's process to establish and announce the date of the review meeting.
 - b. identify an administrative coordinator to assist with organizing the data collection, review process, and report development.
 - c. solicit written confidential evaluations from the entire faculty and fellow body for consideration in the review (if not done previously for the academic year under review).

3. At the time of the initial meeting, the Committee will consider:
 - a. achievement of action plan improvement initiatives identified during the last annual program evaluation
 - b. achievement of correction of citations and concerns from the last ACGME program survey
 - c. fellowship program goals and objectives
 - d. faculty members' confidential written evaluations of the program
 - e. the fellow's annual confidential written evaluations of the program and faculty
 - f. fellow performance and outcome assessment, as evidenced by:
 - o aggregate data from general competency assessments
 - o in-training examination performance
 - o case/procedure logs
 - g. graduate performance, including performance on the certification examination
 - h. faculty development/education needs and effectiveness of faculty development activities during the past year
4. Additional meetings may be scheduled, as needed, to continue to review data, discuss concerns and potential improvement opportunities, and to make recommendations. Written minutes will be taken at all meetings.
5. As a result of the information considered and subsequent discussion, the Committee will prepare a written plan of action to document initiatives to improve performance in one or more of these areas:
 - a. fellow performance
 - b. faculty development
 - c. graduate performance
 - d. program quality
 - e. continued progress on the previous year's action plan

The plan will delineate how those performance improvement initiatives will be measured and monitored.

6. The final report and action plan will be reviewed and approved by the program's teaching faculty, and documented in faculty meeting minutes. A report will be provided to the Designated Institutional Officer for review and reported at a full meeting of the GMEC.

Note: *This policy is designed to comply with ACGME Institutional Requirements, effective July 1, 2013.*

POLICY REGARDING FELLOW TRANSFER

I. Types of Transfers

1. Extramural – transfer of a fellow from another institution to our Cardiology fellowship program, usually occurring outside of a matching program and intended to fill a vacant Cardiology fellowship position. The transfer may occur at the beginning of or at any time during an academic year.
2. Intramural – transfer of a fellow from one WBH fellowship program to Cardiology usually occurring without the fellow going through a matching program to gain entry to accommodate a fellow’s desire to enter Cardiology. The transfer may occur during an academic year but is more likely to occur at the beginning of the next academic year.

II. Fellow Evaluation and Educational Experience Information Acquisition

In accordance with ACGME requirements and in keeping with sound program administrative practice, the Cardiology Program Director will obtain written or electronic verification of the transferring fellow’s previous educational experiences and a summative performance evaluation encompassing the entirety of the fellow’s previous program. The summative evaluation must be competency-based, i.e. inclusive of an assessment to date of the fellow’s achievements in general educational competency domains of patient care, medical knowledge, practice-based learning and improvement, interpersonal and communication skills, professionalism and systems-based practice. It is the responsibility of the Cardiology Program Director to obtain the information from the fellow’s previous program director before accepting the fellow into our Cardiology program, and applies to both extra- and intramural transfers.

III. Additional Fellow Information

1. Extramural transfers – prior to accepting the transferring fellow, the following information must be obtained or done:
 - a. Review of fellow’s CV, past ERAS or other application material, dean’s and others’ letters of evaluation (request current letters as necessary) transcripts, etc.
 - b. Written or electronic letter from the previous program director that, in addition to the foregoing evaluation and experience summary, provides further information regarding the fellow’s desire to transfer, clinical and technical capabilities, relationships with peers and teachers, effectiveness as a learner, professional and personality traits, and any instances of academic remediation or discipline for misconduct of any type.
 - c. Personal discussion with the previous director to review the foregoing and any other elements of the fellow’s past of interest or concern to.
 - d. Explanation of all gaps in training; if years of graduate medical education have not been continuous, determine the reasons for and activities during the interruptions both through direct contact with the fellow and by contacting, as deemed necessary, those supervising or working with the fellow during training gaps.
 - e. Licensure status and ability to qualify for a Michigan medical license.
 - f. Immigration and visa status, assuring such will allow licensure and clearance to work at WBH as a fellow.
 - g. ABMS Board certification status; if there is any question about the transfer’s effect on the fellow’s eventual qualifications to take the Cardiovascular Disease Board examinations, clarification must be obtained from the Board.
 - h. USMLE (M.D.) or COMLEX (D.O.) status for all three examination steps.
2. Intramural transfers – all of the items under “Extramural transfers” apply, recognizing that some of the required information should already exist in WBH program or institutional files.

IV. Information to Provide the Transferring Fellow

Depending on the circumstances of the transfer type, transferring fellow candidates should be informed that:

1. A contract will be offered only after all required information has been obtained and is satisfactory to the Cardiology Program Director.
2. Salary level will be commensurate with the program level he/she will enter at WBH, irrespective of prior training years.
3. Criminal background check and drug screening is required (per policy).
4. Interview (if required) and relocation expenses will not be reimbursed.

V. Hospital Director of Medical Education (DME)

The Hospital DME must be informed immediately by the Cardiology Program Director of any need to recruit or desire to accept a fellow in transfer to Cardiology. The Hospital DME will determine his degree of involvement in the transfer action as required by its circumstances.

VI. Responsibilities to Transfers by WBH Fellows

Per ACGME requirements, the Cardiology Program Director must provide timely verification of fellowship education and competency-based summative performance evaluations on behalf of any fellow who leaves the Cardiology Fellowship program prior to completion, and will cooperate in all additional matters pertinent to fellow transfers out of Cardiology. In all cases, the Hospital DME will be notified of the transfer circumstance.

POLICIES REGARDING DUTY HOURS AND ON-CALL ACTIVITIES

I. Fellow Working and Duty Hours

The program will provide fellows with a sound academic and clinical education that is carefully planned and balanced with concerns for patient safety and fellow well-being. The program will ensure that the learning objectives of the program are not compromised by excessive reliance on fellows to fulfill service obligations. Didactic and clinical education have priority in the allotment of fellows' time and energies. Duty hour assignments ensure that faculty and fellows have responsibility for the safety and welfare of patients.

1. Supervision of Fellows

- a. All patient care will be supervised by qualified faculty. The Program Director will ensure and document appropriate supervision of fellows at all times. Fellows will be provided with rapid, reliable systems for communicating with supervising faculty.
- b. Faculty schedules will be structured to provide fellows with continuous supervision and consultation.
- c. Faculty and fellows will be trained to recognize the signs of fatigue, and to prevent and counteract the potential negative effects.

2. Duty Hours

Duty hours will be monitored by the Program Director through discussion with the Chief Fellow and individual trainees, and by written documentation as described below. These hours will be collected and logged by the Chief Fellow and forwarded to the fellowship coordinator, to be placed in the program files.

- a. Duty hours are defined as all clinical and academic activities related to the fellowship program, including patient care (inpatient and outpatient), administrative duties related to patient care, in-house on-call activities, moonlighting, and academic activities such as conferences. Duty hours do not include reading and preparation outside the hospital.
- b. Duty hours are limited to 80 hours per week, averaged over a four-week period, inclusive of all in-house activities (including on-call and moonlighting).
- c. Fellows will be provided with at least 1-day in 7 free from all educational and clinical responsibilities, averaged over a 4-week period. One day is defined as one continuous 24-hour period free from all clinical, educational, and administrative activities.
- d. Adequate time for rest and personal activities will be provided. This consists of a 10 hour time period (or more) between consecutive duty periods.
- e. Each fellow will be excused from duty after 24-hours of continuous duty + 4 hours 'grace' time. Fellows may not admit new patients; perform invasive procedures in the Echo Lab, Cath Lab, or EP Lab; or participate in Outpatient Continuity Clinic. The fellow may engage in activities to promote appropriate transfer of care and complete progress notes.

3. On-Call Activities

The objective of on-call activities is to provide fellows with continuity of patient care within a 24-hour period. In-house call is defined as those duty hours beyond the normal workday when fellows are required to be immediately available in Beaumont Hospital.

- a. In-house call will occur no more frequently than every fourth night, averaged over a four-week period.
- b. Continuous in-hospital duty, including in-house call and moonlighting, will not exceed 24 consecutive hours. Fellows may transfer care of patients to maintain continuity of medical care.
- c. After 24 hours of continuous duty, fellows may not accept new in-patient admissions, participate in invasive procedures in the Cath Lab, Echo Lab, or EP Lab; participate in rounds; or attend Continuity Clinic.
- d. At-home call (pager call) is defined as call taken from outside Beaumont Hospital.

1. The frequency of at-home call will not be so frequent as to preclude rest and reasonable personal time. Fellows taking at-home call will be provided with at least 1 day in 7 completely free from all educational and clinical responsibilities averaged over a 4-week period.
 2. When fellows are called into the hospital from home, the hours spent in-hospital are counted toward the 80-hour duty hour limit.
 3. The Program Director and the faculty will monitor the demands of at-home call and make scheduling adjustments as necessary to prevent excessive fatigue.
4. Oversight
- a. The Fellowship Training Program in Cardiovascular Disease has written policies and procedures consistent with institutional and ACGME Requirements for fellow duty hours. These policies will be distributed to the fellows and faculty, and will be reiterated during semiannual reviews of the fellows and curriculum. Monitoring of duty hours will be performed on a monthly basis.
 - b. Back-up support systems may be activated by the Program Director when patient care responsibilities are unusually difficult or prolonged, or if unexpected circumstances create fellow fatigue and jeopardize patient care.
 - c. At the beginning of each academic year, fellows will be asked to review and sign an “attestation statement” by which they acknowledge the accuracy of anticipated duty hours while on rotations. The duty hour ranges cited within each attestation statement will be calculated from past and/or current on call schedules. Throughout the course of the academic year, all fellows will be periodically asked to record actual work hours for a week at a time as a means of further verification.

**BEAUMONT HOSPITAL
CARDIOVASCULAR DISEASE FELLOWSHIP TRAINING PROGRAM
DUTY HOURS ATTESTATION STATEMENT**

PGY-4 (1st Year Fellow)
Academic Year 2018 - 2019

Name of Fellow: _____

While on Cardiology service rotations this year, I have a monthly average of 4 weeknight and 2 weekend call assignments. My daytime duty hour assignment is 7:00 a.m. to 6:00 p.m., Monday-Friday. Based on duty hour calculations available in program files, the average weekly duty hours range from 54 to 71. This range factors in the requirement that I am excused from duty no later than six hours after completing 24-hours of continuous duty. This total is potentially reduced or increased by the amount of time I arrive before or after 7:00 a.m. or leave before or after 6:00 p.m. each weekday.

I have reviewed the above duty hour assignments and confirm their accuracy. I have also reviewed all other ACGME duty hour requirements pertinent to this program and can attest to the following:

1. My total duty hours per week are less than 80 hours averaged over four weeks.
2. I have at least 10 duty-free hours between all daily duty periods.
3. I have one full day in seven free of duty averaged over four weeks.
4. I have a call frequency less than one in three averaged over four weeks.

In addition to attesting to the above I also agree to:

1. No internal moonlighting during my first year of fellowship training.
2. Report to the program director any excess duty hour circumstances that might cause me to be in substantial violation of the ACGME regulations. I expect the program director to take the necessary corrective action to prevent such violations from occurring repetitively.

Fellow Signature

Date

Program Director Signature

Date

POLICIES REGARDING MOONLIGHTING

- a. Because fellowship education is a full-time endeavor, the Program Director will ensure that moonlighting does not interfere with the goals and objectives of the educational program.
- b. The Program Director will comply with the policies and procedures regarding moonlighting, set forth by Beaumont Hospital.
- c. Moonlighting will be counted toward the 80-hour weekly limit on duty hours.
- d. Moonlighting is limited to 2nd, 3rd, 4th, and 5th year fellows who may moonlight up to 4 nights per month on the “B Service” of Beaumont Hospital. Moonlighting outside the hospital is prohibited. Moonlighting by Cardiology fellows will be permitted only if approved in writing in advance by the Program Director.
- e. For the fellows well being and patient safety, fellows with excessive fatigue will be required to curtail moonlighting activities.
- f. In order to moonlight a permanent Michigan medical license is required.
- g. Professional liability coverage extended by Beaumont Hospital while performing duties under contract only applies to moonlighting within the hospital.
- h. Failure to obtain permission to moonlight or continued moonlighting despite denied permission may lead to suspension or dismissal from the program. All moonlighting activities and permission forms will be reviewed at the beginning of each new academic year. It is the fellow’s responsibility to bring to the Program Director’s attention all requests for moonlighting positions, all changes in moonlighting hours, and any discontinuation of moonlighting jobs.
- i. Daytime moonlighting is not permitted.
- j. Fellows may not leave early or arrive late in order to moonlight.
- k. Simultaneous moonlighting shifts and night or weekend call are prohibited.
- l. Factors that influence the decision to approve moonlighting include, but may not be limited to the following:
 - 1) Overall clinical performance, academic progress and training attitude
 - 2) Timeliness of completion of medical records, dictation’s, and faculty evaluations.
 - 3) Daytime inattentiveness and excessive fatigue.
 - 4) Completion of the “Moonlighting Request Form”.

MOONLIGHTING REQUEST FORM*
DEPARTMENT OF CARDIOVASCULAR MEDICINE
 (*A separate form must be completed for each requested position)

Name (print)_____ Date of request_____

Year in program: I II III

Why do you want to moonlight? _____

Requested moonlighting position: _____

Institution/practice: _____

Address: _____

Responsible moonlighting director/physician:

Name _____

Address (if different) _____

Phone number _____

Duties / Responsibilities _____

Hours/week_____ Hours/month_____ Weeknights/week_____ Weekend days/month_____

I have read and agree to abide by the department's moonlighting guidelines and rules and understand that failure to comply with them may result in my suspension or dismissal from the fellowship program. I also understand that Beaumont Hospital has no professional liability coverage responsibility for any litigation arising out of my moonlighting activities outside of the hospital.

 (Fellow signature)

 (Date)

Moonlighting request approved: **YES** **NO**

If no, specified reason(s) _____

 (Program Director signature)

 (Date)

POLICIES REGARDING DOCUMENTATION OF PROCEDURES

I. Procedure Logs

Fellows are required to maintain accurate records for all invasive and noninvasive procedures. New Innovations has a link that fellows are encouraged to use, to support such documentation. At the end of each month, the Medical Director for the rotation will sign and date the procedure log, and a copy should be given to the Fellowship Coordinator. The log should include the nature of the procedure, patient name and medical record number, date of the procedure, indications for the procedure, and complications. The fellow is responsible for ensuring that the log is accurate and current, and that procedures are verified by the appropriate attending. At the completion of the academic year, the Medical Director of the appropriate service will sign a letter of certification of these procedures. This letter will be co-signed by the Program Director, and a copy will reside in the fellows' files.

Procedure log sample

Name	Hosp #	Date	Attending	Indication	Complication	Procedure

POLICIES REGARDING DETECTION AND MANAGEMENT OF FATIGUE

- a. Awareness
On a yearly basis, fellows are required to attend a formal lecture on “Fatigue – How to recognize the signs of fatigue and counteract the potential negative effects.” Recognized experts on this topic, such as Dr. Koltonow, Dr. Drake, or Dr. Roth will give the lecture.
- b. Detection
The Program Director will meet with the fellows on a monthly basis. One of the purposes of this monthly meeting is to assess workload, adherence to duty hour requirements, and fatigue. The Program Director will meet every 2 weeks with the Chief Fellow, to assess these issues.
- c. Management
The expectation is that awareness and detection of fatigue and sleep problems will minimize the need for active management. Strict avoidance of excessive duty hours should avoid most problems with work-related fatigue. The solution to other causes of fatigue, such as dealing with newborn children and their sleep patterns, will be handled on an individual basis as needed.
- d. Signs of dangerous fatigue level include:
 1. Inconsistent performance
 2. Overt sleepiness, yawning, and nodding off during conferences

Advisor/Mentorship program:

Incoming fellows in the first year of their clinical fellowship will be assigned an attending as a mentor for 1 year duration that may be changed in the following years. The role of the mentor will be:

1. Research mentorship: assisting fellow with research proposals, abstract submission, paper writing, completion of projects, HIC applications.
2. Professional development: The faculty will act as a resource for the assigned fellow, to assist with her/his progression through the training years. He/she will provide advice and guidance through different rotations as required.
3. Personal guidance: the fellow will have access to the attending for advice regarding personal matters that the fellow wishes to discuss and seek advice in a confidential and collegial manner.

POLICIES FOR TRAVEL, VACATION, LEAVE OF ABSENCE, AND MATERNITY LEAVE

I. EDUCATIONAL LEAVE

1. Fellows at all training levels are allowed up to one week of educational leave per academic year (in addition to 3 weeks of vacation time). Additional educational leave may be taken only if approved by the Program Director, but this additional time will be taken from vacation time.
2. The following guidelines should be followed with respect to weekday travel:
 - a. On the day prior to the day on which a meeting starts in the Eastern or Central Time zones, the fellow is expected to work all or most of the day. It is generally easy to obtain flights in the late afternoon or evening. If the meeting is in the Mountain or Pacific zones, it may be necessary to allow more time for travel.
 - b. For meetings that end at 5 p.m. in Eastern and Central sites, the fellow is expected to return on the same afternoon or evening, and return to duty the next day. For meetings on the West Coast or Rocky Mountains, fellows are not expected to take the “red-eye” flight. The next day may be taken for travel, if necessary.
3. The Hospital will generally reimburse lodging expenses for the night before each meeting, and for one post-meeting night only when travel on the last meeting day is not feasible from the West Coast or Mountain time zone. Any other travel days will not be reimbursed by the Hospital, and will be taken as vacation days.
4. If meetings end on a Saturday in the Eastern and Central zones, a Saturday overnight stay will be reimbursed only if the savings from a reduced airfare exceeds the cost of another night lodging.
5. If a special circumstance warrants an exception to these guidelines, written permission must be obtained in advance from the Program Director or coordinator.
6. **Pre-authorization must be obtained for all travel outside Beaumont Hospital, to assure reimbursement.** Form 906 (Application for Seminar/Conference) must be completed and submitted to accounting prior to the Conference. Accompanying this form should be a copy of the brochure, a copy of paper/presentation/research (if applicable) and any travel details and pre-purchased receipts (hotel, registration, flight). Travel arrangements can be made personally or through Egencia <https://www.egencia.com/pub/agent.dll?qscr=grph&> (866) 328-0110. If you have any questions, please check with Toni Haggerty (ext 84176) before you make arrangements. If these procedures are not observed, reimbursement could be denied. **CAR RENTALS MUST BE APPROVED IN ADVANCE BY MEDICAL ADMINISTRATION.** The maximum allowance per conference is \$1,100 if you are presenting at the conference.
7. Upon return from the conference, the following items must be submitted within one week of your return:
 - a. Original airline ticket stub or e-ticket (not the boarding pass)
 - b. Original lodging invoice, which must indicate it was paid – maximum of \$300/night
 - c. Original transportation receipts (bus, shuttle, taxi, airport parking, etc. – amount and date)
 - d. Meals – maximum allowance \$45.00 per day with itemized receipts only
 - e. Pre-paid registration – original receipt
8. Fellows may receive up to \$1,100 allowance from Cardiology Administration and \$800 from Medical Administration for travel to the American College of Cardiology, the American Heart Association, or the

Michigan Chapter of the ACC in Traverse City, if they are presenting an abstract or poster. Travel allowances cannot be applied to the annual Beaver Creek or Caribbean Conferences. Fellows must notify the Chief Fellow and Fellowship Coordinator at least 2 months in advance if they plan to attend a meeting. The final decision must be approved by the Chief Cardiology Fellow, and Program Director to assure adequate coverage and funding.

9. A maximum of 2 fellows may attend out-of-town Beaumont sponsored conferences if approved by the Program Director 2 months in advance. Local Beaumont conferences may be attended by up to 4 fellows if approved by the Program Director in advance.

Please note that if any of your requests are vendor-sponsored you must apply for an educational grant and/or make payment arrangements funneling all travel reimbursement through Beaumont – per Beaumont’s compliance. Vendors cannot direct pay for any meals or travel.

II. VACATIONS

1. Fellows may take vacation during the following rotations:

1 st Year Fellows:	Echo, Nuclear, and Cath Lab
2 nd Year Fellows:	Elective, Nuclear, Echo and Cath Lab
3 rd Year Fellows:	Elective, Echo, Cath Lab, Nuclear and Research
2. Three weeks of vacation (plus one week for conference time) may be taken each year. Vacation time cannot be accumulated from year to year. Please plan your vacations early, since only one fellow may be on vacation at any given time, and no more than two clinical fellows may be absent from the hospital at the same time.
3. Vacations may not be taken during national meetings (ACC and AHA), CCU rotations, and between Christmas and New Years’ holidays.
4. Third year fellows: no vacation in June.
5. First and second year fellows: Okay to take vacation in first 3 weeks of June; no vacations during last week of June.
6. ALL fellows should arrange coverage for their outpatient clinic while on vacation.
7. Vacation requests must be made through the Chief Fellow at least eight weeks in advance, followed by approval of the Program Director.

III. LEAVES OF ABSENCE

1. Leaves of absence (with or without pay) for severe illness or other personal reasons may be granted for up to 2 additional weeks. Hospital Policy No. 255 defines the following categories of leaves of absence:
 - a. Family/Medical
 - b. Personal
 - c. Military
 - d. Workers Compensation
 - e. Educational
2. Taking a sick day for legitimate illness will not be questioned. However, the Program Director is authorized to request documentation of illness in ambiguous situations. Absence due to illness may count toward the time allowed for vacations and meetings at the discretion of the Program Director. When such an absence is necessary, the fellow must notify the Fellowship Coordinator, the Chief Fellow and the Program Director, who will notify the attending physician. If the fellow is scheduled to be on call, the Chief Fellow will help arrange coverage, but the absent fellow may be required to make up missed time and call.
3. A fellow must submit a formal request for leave of absence to the Program Director whenever an absence or illness exceeds seven (7) calendar days. Approval of leave of absence may require certification by the fellow's personal physician.
4. Clinical fellows are allowed three working days for job interviews. If more time is needed, it will be taken from vacation time.

IV. PREGNANCY AND MATERNITY LEAVE

1. Fellows who become pregnant during the training program have responsibilities to themselves, their family, the unborn child, and the fellowship. Accordingly, pregnant fellows should notify the Program Director as soon as it is reasonable to do so, to allow the Program Director to make arrangements to assist the fellow in making a smooth transition from the training program, to maternity leave, and back to the training program.
2. Complications or other medical problems that arise during pregnancy will be handled in a manner that is similar to other medical leaves of absence, and will be subject to the same policies.
3. After delivery, fellows may take up to 6 weeks of leave, without concern about extending the length of training.
4. Fellows who have multiple maternity leaves during training may not be able to satisfy their graduation requirements during the 3 years of fellowship training. The Program Director and the Director of Medical Education will handle this situation on an individual basis.
5. The fellow is not responsible for arranging coverage while on maternity leave. The Chief Fellow and Program Director will make coverage arrangements.
6. Fellows on maternity leave are not expected to "make-up" call nights.

V. LEAVE OF ABSENCE AND ABIM POLICY

1. The American Board of Internal Medicine has specific policies regarding minimum length of training for Board eligibility when an extended leave of absence has occurred. Accordingly, fellows may not simply choose to sacrifice vacation to finish the program on time. Fellows are encouraged to discuss this with the Program Director and the Director of Medical Education, who will serve as the final arbiter in questions arising from this policy. It is our desire to be fair to all concerned when considering these issues. Fellows must view the policy in light of the responsibility they have to their training, to their peers, and to the integrity of the Board certification process.
2. The ABIM applies the same policy regarding leave of absence regardless of the reason for absence.
3. During three years of clinical cardiology fellowship, each fellow is entitled to be absent from training for a maximum of 4 weeks per year, or a total of 12 weeks. This includes medical leave, personal leave, maternity leave, vacation, and conference time. Leaves of absence that exceed 12 weeks over 3 years will require an extension of training, to meet requirements for Board certification.
4. Ambiguous situations will be resolved by the Program Director and Director of Medical Education.

VI. THE FOLLOWING VACATION/LEAVE REQUEST PROCEDURE IS REQUIRED:

- a. Vacation/Leave request forms must be submitted to the Chief Fellow for approval two months in advance. All requests must be approved by the Program Director. The Fellowship Coordinator keeps the completed forms on file, and is responsible for maintenance of a vacation/leave calendar.
- b. Any special circumstance (illness, maternity leave, death in the family, etc.) should be addressed with the Chief Fellow and the Program Director.
- c. It is the fellow's responsibility to notify the Chief Fellow(s), Hospital Communications, and the Fellowship Coordinator of any changes in the on-call schedule resulting from unexpected leaves of absence.
- d. No fellow will be "pulled" from an assigned rotation to cover another rotation without the approval and knowledge of the Chief Fellow, Fellowship Coordinator and Program Director.
- e. Under NO CIRCUMSTANCES may graduating fellows take vacation during the month of June. Graduating fellows are required to be in the hospital up to and including June 30th. NO EXCEPTIONS. First and second year fellows may take vacation during the first 3 weeks of June, but not during the last week of June.

POLICY FOR SUPERVISION OF CARDIOLOGY FELLOWS

One of the primary goals of the Fellowship Program is to provide an ideal environment for teaching, education, research, and patient care. To meet these goals, attending/teaching faculty supervision of all fellow activities is required, to maximize teaching and educational opportunities, minimize 'service' activities, and provide excellent patient care. For invasive procedures, such as cardiac catheterization, electrophysiology procedures, and transesophageal echos, the expectation is that an attending physician will provide immediate on-site supervision at all times, including regular hours and off-hours. For less invasive patient contacts, such as patient evaluations in the hospital, there must be direct interaction between the fellow and attending physician. The expectation is that this will be a face-to-face interaction during regular working hours, including a 'hands-on' visit to the patient by the fellow and attending. After hours, the expectation is that such interaction will occur by telephone at the time of patient contact, and a face-to-face interaction as soon as possible thereafter. In the context of fellowship training, 'service' activities are defined as activities by the fellows that have no educational reward, in which a service is provided by the fellow but there is no interaction with a supervising attending physician. These kinds of 'service' activities are strongly discouraged. The Program Director recognizes the balance between fellow independence and faculty supervision, and these issues are described more fully in the Core Curriculum under each specific rotation, in which fellows acquire progressively more independence as they advance through the training program. In general, fellows are not required to participate in procedures that are performed by non-teaching faculty (except as described in the Cardiac Catheterization Laboratory coverage for acute MIs and other emergencies). However, fellows may participate in such activities with non-teaching faculty at their discretion, depending on completion of their other responsibilities.

PARKING POLICY AT ROYAL OAK CAMPUS

The hospital provides adequate free parking for all residents and fellows. Accordingly, it is important for our fellows to park in areas designated for this purpose, as delineated below. Fellows are not permitted to park in places that are designated for patients and visitors, since doing so may limit parking access to our patients and their families. Fellows who violate this parking policy will be subject to discipline including a fine (\$100) and booting of their vehicle for the first offense, and possible suspension for repeat offenses.

Any questions regarding parking availability and other regulations should be addressed to Jim Clark, Director, Security and Parking, at extension 10916.

1. **South Deck-West (card access)** – entrance at the South Deck's receiving dock side, southwest corner; parking allowed on South Deck-West floors 2, 3, 4 and South Deck-West and East floor 5 (roof).
2. **South Doctor Lot (card access)** – located adjacent to the north side of the research building; after 9:30 a.m., this lot will also be available to other employees.
3. **North Doctor Lot (card access)** – located east of the West Deck.
4. **West Deck** – open to all residents/fellows and other employees; card access required for all after 9:00 a.m.
5. **South Lot** – shuttle service available; do not park in Patient/Visitor section of lot.

DRESS CODE

All fellows are expected to dress in business attire and white coats during all clinical rotations, hospital rounds, and continuity clinic. Exceptions apply to after-hours night call, and rotations in the cardiac catheterization and electrophysiology laboratories.

CARDIOLOGY FELLOWS
July 1, 2018 – June 30, 2019

Clinical

3rd Year – PGY 6

* Michael Ashbrook, MD
Sara Karnib, MD
Rami Khoury, MD
Craig Tucker, MD

2nd Year – PGY 5

Richard Bloomingdale, MD
Ashish Chaddha, MD
Amy Mertens, DO
Jason Schott, DO

1st Year – PGY 4

Rick Gaines, MD
Thomas O’Connell, MD
Daniel Tim, MD
Travis Tagami, DO

Pager#

Phone#

Interventional

PGY 7

Anthony DeCicco
Kyle Feldmann, MD
Jacob Goldstein, MD
Brian Renard, MD
Daniel Rothschild, MD

Pager#

Phone#

Advanced Training

Joseph Burke, MD
Pratik Dalal, MD

Electrophysiology (EP)

PGY 7

Christopher Bradley, MD
Divyashree Varma, MD

Advanced Imaging

* Chief Fellow

ROLE OF CHIEF CARDIOLOGY FELLOW

1. To arrange month-to-month and day-to-day schedule for all fellows, including coverage for personal emergencies or leaves of absence.
2. To coordinate all vacation requests. All vacation requests must be submitted at least 8 weeks in advance and be approved by the Chief Fellow and the Program Director.
3. To inform the relevant services of special situations which might limit fellow coverage (e.g., National Boards, ACC, AHA, and Christmas schedule).
4. Any problem or complaint should be directed to the Chief Fellow or Program Director, so the problem can be resolved quickly.
5. The Chief Fellow will participate in formal administrative committee activities including fellow selection, curriculum evaluation, and other important hospital committees concerning resident/fellow education.
6. Perform monthly evaluations of clinical fellows as part of the 360-degree Evaluation process.

EDUCATIONAL CONFERENCES

The following cardiology conferences are required for all clinical cardiology fellows (1st, 2nd, and 3rd year), unless indicated otherwise. All conferences are held in the main conference room in the Heart Center, 1st floor unless otherwise stated.

1. Cardiology Morbidity & Mortality Conference: First Monday of each month, 7:00 – 8:00 am
2. Cardiology Grand Rounds: First Monday of each month, 8:00 – 9:00 am
3. Professor Rounds: First Monday of each month at 11:00 am
4. Cine Review Conference (Dr. Ramos): will be incorporated into noon conferences
5. Combined Cardiology/Cardiac Surgery Catheterization Conference: Every Tuesday, 7:30 – 8:30 am
6. Cardiology Noon Conference: 5 days per week (see Master schedule); lunch is usually provided, 12:00 Noon – 1:00 pm
7. Research Conference: will be incorporated into noon conferences
8. Echo Conference: will be incorporated into noon conferences
9. Ernst Conference: optional conference for those interested in structural heart disease; every Monday at 7:00 am in the Ernst Conference Room

Required Courses

William Beaumont sponsors the following courses. Attendance for all cardiology fellows is required:

1. Mandatory Education on Inpatient Medical Record Documentation, TBD 12:00 Noon, 1st floor Heart Center Conference room
2. Mandatory Education for Residents and Fellows: On-line courses mandated by William Beaumont, “Patient Confidentiality, Fire Safety, Annual Infection Control, and Radiation Safety”. These must be completed by August 31, 2013.
3. Cultural Diversity – Month of October dates and times to be determined.
4. “Healthcare Financing: How We Get Paid for What We Do” 3rd year fellows - TBD
5. “Professional Practice Necessities” – 3rd year fellows – TBD
6. “Preparing Residents for the Realities of Practice” – 3rd year fellows –TBD
7. “Personal Financial Security: What I Wish I Knew When I Was Thirty” – 3rd year fellows – TBD.

Safety & Quality Initiatives

Project 1: PCI Appropriateness

Fellows:

QA Meeting: PCI Quality Mtg (usually occurs on third Wednesday of each month at 9 am), Cardiology Peer Review (usually occurs on fourth Wed of each month at 7 am)

Quality Staff Contact: Allison Havens

Staff: Hanzel, Rabah

Data: BMC2 PCI, NCDR data, quarterly reports, etc

Projects: reduce rate of “unclassified lesions”, address issue of PCI in “maybe or rarely appropriate” clinical context. Improve documentation (stress test data, cath report quantitation of CAD lesion severity, etc).

Project 2: PCI Safety and Quality

Fellows:

QA Meeting: PCI MI Quality Review (usually occurs on third Tuesday each month with Dr Dixon), Cardiology Peer Review (usually occurs on fourth Wed each month 7 am)

Quality Staff Contact: Chantal Chin, Jannet Pattison

Staff: Dixon, Berman

Data: NCDR, BMC2 Database

Projects:

1. Post procedural CVA
2. Post procedural CIN
3. Post procedural vascular and bleeding complications
4. Cath lab radiation exposure

Project 3: UHC University Hospital Safety and Readmission Data

Fellows:

QA Meeting: Cardiology Quality Meeting (Dixon, et al) Time and Place TBD

Quality Staff Contact: Patty Sartori

Staff: Dixon, Hospital admin

Data: UHC hospital administration data (Flanders, et al)

Projects:

1. 30 day readmission after PCI (or CHF, etc)
2. DTB time or other STEMI parameters
3. Include a focus on “Health Care Disparity” in these projects – ie assess difference between patient sub sets and outcome (ie Medicaid vs Non Medicaid for 30 day readmit, DTB, etc)

Project 4: CCU Best Practices Cmte

Fellows:

QA Meeting: CCU Quality Cmte (Time and Place TBD)

Quality Staff Contact: TBD

Staff: Berman, Gallagher

Data: EPIC, CCU data

Projects:

1. Best practices (AMI Rx, PE Rx, CHF, etc)
2. Documentation (MCC documentation, EPIC notes, etc).

Project 5: EP Quality Cmte

Fellow:

QA Meeting: EP Quality Meeting (Time and Place TBD)

Quality Staff Contact: TBD

Staff: Haines,

The Beaumont Standards

Our mission is to provide the highest quality health care services to all of our patients; safely, effectively and compassionately, regardless of where they live or their financial circumstances. As such, Beaumont employees are required to know, own and adhere to the following standards and expected behavior:

Service – We make those we serve the highest priority

- Response – Provide prompt and appropriate attention to our patients and visitors. If a patient's call light goes on, anyone is responsible to respond, regardless of job classification.
- Information – Provide clear explanations and accurate information every 20 minutes or as appropriate.
- Assistance – Proactively take any concern or complaint seriously and see resolution with empathy and understanding. Ask for help if needed.
- Introductions – In person, or by phone, smile and introduce yourself by name, function and service you are offering. Address patients/families by their name and proper title (i.e. Mr., Mrs., Ms.). Answer phone calls within three rings, ask permission to put a caller on hold (if needed) and always ask, "How may I help you?"

Ownership – We are positive ambassadors who take responsibility for creating the Beaumont experience.

- Directions – Offer to escort others who appear lost and in need of assistance. Use full hand gestures when directing.
- Safety – Support a safe environment through pro-active attention to, and reporting of potential hazards. Wash your hands.
- Environment – Promote a clean, quiet and healing atmosphere. Refrain from loud talk and excessive noises.
- Eco-friendly – Pick up litter and recycle or reuse materials when possible.
- Innovation – Create a culture of excellence through suggestions, performance improvement and continued personal growth and development.

Attitude – We demonstrate positive behaviors with the highest degree of integrity

- Courtesy – Use professional behaviors and language in all interactions. Greet everyone with an empathic smile and eye contact. Offer to exit elevators if needed for patients and visitors.
- Image – Observe the highest standards of professional behavior and appearance. Wear the Beaumont ID badge with name and picture displayed at all times.

Respect – We treat everyone with dignity and respect

- Teamwork – Work together respectfully to create a team atmosphere. Avoid the use of hand held devices and cell phones in meetings.
- Dignity – Respect diversity including cultural and spiritual differences. Affirm patients' rights to make choices regarding their own care. Support emotional needs.
- Confidentiality – Hold all patient and employee information in the highest confidence. Discuss patient information and use patient names in private areas.
- Privacy – Knock or ask permission before entering. Close the doors and curtains during exams, procedures and/or interviews, with an explanation that this is done for privacy. Provide second gowns to cover patients as needed.

The Image and Appearance Standards

In accordance with the Beaumont standard of Image, residents, fellows and employees are expected to maintain exceptionally high standards for grooming, dress and personal conduct. Not only are fellows expected to dress professionally, appropriate to their discipline, it is also expected that we demonstrate professional image and conduct at all times while on Hospital business. This includes all of the phases of the employment process.

Residents, fellows, and employees must present themselves in business attire, appropriate for the hospital setting; wearing low-cut, sleeveless or revealing tops, T-shirts, sweat-suits, sports jerseys, spaghetti strap dresses, shorts, jeans, leggings, stirrup pants, double stitched pants, short/miniskirts or military style fatigues should not be worn. Visible tattoos are not appropriate for the healthcare and/or professional work environment. Clothing shall appropriately conceal tattoos. No visible body piercing, other than the ear is permitted. Clean and well-groomed fingernails are required. In patient-care areas nails must not be longer than ¼ inch beyond the fingertip. Artificial fingernails are prohibited for infection control reasons for all patient-care staff, those employees who receive standard precautions annual training and/or handle items to which patients are exposed. Please refrain from wearing lotions, perfumes or other scented products, and abide by the smoke free workplace policy.

Occupational Health Services - Pre-employment Physical

As a major health care provider in southeastern Michigan, Beaumont Health System recognizes its responsibility to educate the public regarding health issues and the behavior changes necessary to achieve health, as well as serve as a role model in promoting healthy behaviors for residents of the community that it serves. In keeping with this obligation to the community, effective January 1, 2013, we will test all potential hospital employees for nicotine and will not hire those who test positive for nicotine from tobacco use. Those who test positive for nicotine from tobacco use may reapply for employment after 6 months.

Anyone accepting a position with Beaumont Health System is required to complete a pre-employment physical examination in Occupational Health Services.

The examination includes a laboratory test for the detection of substance abuse and nicotine. If scheduled for a pre-employment physical, it is essential that you notify Occupational Health Services of any medication – prescription or over the counter – you have taken within the past 30 days. Please be advised, if a positive finding of substance abuse and/or nicotine from tobacco is found, you will be disqualified from employment consideration at Beaumont Health System. The examination does require an annual flu vaccination, Tdap as well as varicella, rubella, rubeola and mumps vaccinations, unless the antibodies are otherwise present. Finally you are required to complete a Tuberculosis test. Occupational Health Services must read the TB test within 48-72 hours of administration. The TB test must be completed, and if necessary, immunizations administered, prior to beginning work.

I have read and understand the information presented to me on this form. I am aware that if I am offered and accept a position with Beaumont Health System, I am expected to adhere to all of Beaumont's policies and procedures, including the Beaumont Standards, the Image and Appearance Standards and the pre-employment physical. Failure to do so may result in disqualification from employment consideration or progression into the performance management program. Furthermore, I understand that signing this acknowledgement is a condition of employment; refusal to sign may result in disqualification from further employment consideration.

Print Name

Date

Signature

Date

Core Curriculum

General Definition of Core Competencies in Cardiovascular Diseases

All fellows are expected to have full awareness of the six core competencies, as they pertain to the fellowship curriculum:

Interpersonal and Communication Skills: ability to establish effective communication with patients and families, using appropriate listening and verbal skills. This communication should be patient- and family-oriented, and involves understanding the nature of the patients' problems, and providing verbal and/or written information regarding the nature of the patients' problems and their implications. Additional information should be provided that has an impact on cardiovascular care, including issues about risk factor and lifestyle modification; rationale and nature of noninvasive testing; and thorough explanation of the risks, benefits, and alternatives of invasive procedures. Other aspects include communication with paramedical and nursing staff and referring physicians that pertain to patient care.

Medical Knowledge: refers to the fund of medical knowledge, including pathophysiology of cardiovascular and related diseases, physical diagnosis, differential diagnosis, and awareness of pertinent cardiovascular medical literature. A thorough understanding of evidence-based medical practice and ACC/AHA guidelines is essential.

Patient Care: is the integration of cognitive, technical, and interpersonal skills to permit optimal care of cardiovascular patients. Patient care involves outpatient and inpatient services, including invasive and noninvasive testing areas, outpatient clinic, and inpatient services such as CCU and the Inpatient Clinical Service. At all times, patient care will be compassionate and appropriate for promotion of cardiovascular health. Patients with end-stage diseases should receive appropriate medical, psychological, and social support, and be provided with a thorough understanding of end-of-life issues and services.

Practice-Based Learning Improvement: is the ability to use various modalities for self-improvement and professional enhancement. These modalities include incorporation of feedback from attending physicians on various cardiovascular rotations, input from the Program Director during semi-annual performance reviews, other feedback that may be generated during regular conferences such as Morbidity and Mortality Conferences, Cardiology Quality Assurance meetings and the results of the Cardiovascular Inservice Examination.

Professionalism: is the demonstration of behavior that reflects tolerance, fairness, honesty, compassion, and mutual respect for others of differing cultures, opinions, religions, economic stature, political orientation, and sexual orientation. Professional behavior is expected in dealing with patients, families, referring physicians, paramedical staff, and nursing personnel. Strict adherence is required to the principles of patient confidentiality, informed consent, and intellectual and scientific integrity.

System-Based Practices: involves the utilization of various external resources to improve patient care. Examples of such resources that pertain to Cardiovascular Diseases include the use of web-based programs such as ACC/AHA Practice Guidelines, Epocrates, and TIMI Risk Score. These external resources should be used to assess issues about patient safety, causes of errors in patient care, and cost-effectiveness issues.

Cardiovascular Disease Specific Definition of Core Competencies

Patient Care:

1. Fellows will demonstrate the ability to take a history relevant to cardiovascular diseases and perform a directed cardiovascular physical examination in an adult patient population that includes both men and women and is ethnically diverse. Patient encounters will occur in both the inpatient and outpatient setting, including all cardiac procedure laboratories.
2. Fellows will demonstrate the ability to judiciously order diagnostic tests that are clinically appropriate and cost effective.
3. Fellows will demonstrate the ability to safely perform all invasive diagnostic tests for which they seek certification. In addition to procedure performance, fellows will be expected to demonstrate knowledge of appropriate indications, contraindications, and post-procedure complications specific to each cardiac procedure.
4. Fellows will demonstrate the ability to accurately interpret the results of all invasive and non-invasive diagnostic tests and procedures for which they seek certification.
5. Fellows will demonstrate the ability to integrate all social aspects of patient care, including gender sensitivity, cultural diversity, and economic issues.
6. Fellows will demonstrate the ability to provide appropriate follow-up care in both the inpatient and outpatient setting.
7. Fellows will demonstrate the ability to synthesize all history, physical examination, and diagnostic testing information into a well-thought out logical plan of care that is documented in a clearly organized consult or note.
8. Fellows will demonstrate the ability to triage and manage critically ill patients in the on-call setting.
9. Fellows will demonstrate the ability to be patient advocates by utilizing hospital resources, such as social work, consult services, pharmacy services, etc, to help facilitate the best possible patient care.
10. The above elements will be evaluated by direct observation and interaction with the cardiology faculty.

Medical Knowledge:

1. Fellows will assist in conducting rounds on inpatient services and/or present patients directly thereby allowing the supervising attending physician to assess their medical knowledge as it relates to specific patient cases.
2. Fellows will provide periodic didactic teaching sessions for the house staff on inpatient teaching rounds.
3. Fellows are expected to develop a reading system that will facilitate a broad knowledge base of cardiology. This reading system should include major cardiology texts, landmark clinical trials, and current literature published in common cardiology journals.
4. Fellows will present at a variety of weekly conferences, including Echo and Cath Conference.
5. Fellows will present an article yearly at Journal Club.
6. Fellows will maintain a thorough procedure log to document technical skills training.
7. Fellows are expected to attend at least 80% of teaching conferences that are designed to cover a thorough curriculum in cardiovascular diseases.
8. Each fellow will have the opportunity to attend a national meeting once a year.
9. Fellows present patients to the attending and are directly observed while performing invasive procedures.

Practice-Based Learning Improvement:

1. Fellows will learn to use information technology, literature sources, and other available resources to learn to practice evidence-based medicine that is guided by sound medical principles consistent with the standard of care and approved practice guidelines.
2. Fellows will learn to individualize patient management based on the available resources and the circumstances particular to the patient.
3. Fellows must be able to analyze their clinic and rotation experiences and discuss methods for improvement as it relates to patient care, fellow education, and junior house staff education.
4. Fellows must be able to recognize their own limitations in knowledge base and clinical skills and be receptive to life-long learning.

5. Fellows will periodically meet as a group with the program director to discuss identified problems and potential solutions.
6. Fellows must be able to use the medical literature to update their practice methods and improve patient care.
7. Fellows must be able to critically evaluate the medical literature.
8. Fellows approach to and use of the medical literature will be assessed by the supervising staff physician on a given rotation.
9. The ability of the fellow to critically evaluate the literature will be assessed during the fellow's yearly presentation at journal club.

Interpersonal and Communication Skills:

1. Fellows will learn to effectively communicate as a consultant cardiologist to the referring health care provider and other members of the health care team.
2. Fellows will learn to communicate a patient's medical diagnosis and potential therapies or procedures in a manner that is easily understood by the patient and his or her family members.
3. Fellows will learn to generate accurate, thorough, and easily understood reports for cardiac procedures.
4. Fellows will learn to listen to and understand patient and family member concerns.
5. Fellows are expected to provide thorough, timely, and legible written consultations in the patient's medical record.
6. These skills will be evaluated by direct observation from the attending physicians as fellows rotate through the clinical services, and the results will be reported via monthly rotation evaluations.

Professionalism:

1. Fellows are expected to treat patients and their family members, colleagues, house staff, support staff, and administrative staff members with appropriate respect.
2. Fellows are expected to approach patient care with compassion and integrity and to be sensitive to individual patient needs with respect to patients' age, gender, culture, and/or disabilities.
3. Fellows are expected to maintain the highest ethical standards including maintaining strict patient confidentiality, ensuring adequate informed consent, adhering to ethical business practice, and informing patients of all practical therapeutic options.
4. Fellows are expected to be committed to excellence and on-going professional development.
5. Fellows are expected to report to work in a timely fashion that provides adequate time to prepare for rounds, instruct junior house staff, and attend to complicated or critically ill patients.
6. Fellows will check out any patient issues that may need attention overnight to the on-call fellow.
7. Professionalism will be evaluated through direct observation by attending physicians and reported via rotation evaluations.
8. Professionalism will be evaluated by support staff members via 360 degree evaluations.

System-Based Practice:

1. Fellows will learn to interact professionally in the context of the health care system as a whole and remain sensitive to the role of ancillary services, other health care providers, good business practice, and adherence to high ethical standards.
2. Fellows will learn to work with all members of the health care team (nurses, social workers, pharmacists, etc) to provide the best and most efficient plan of care for all patients.
3. Fellows will specifically learn to integrate various cardiology services and procedures with the medical and surgical services involved in the patient's care.
4. Within cardiology, fellows will learn to integrate the services and procedures provided by the various cardiac disciplines involved in the patient's care.
5. Fellows will learn to partner with a patient's primary care provider in order to ensure that the best possible care is provided to the whole patient.
6. Fellows will learn to practice cost-effective health care while not compromising quality of care.
7. Fellows are expected to be strong patient advocates.

CORONARY CARE UNIT (CCU) ROTATION

Director: Steven Timmis MD
Teaching Faculty: Aaron Berman MD, Michael Gallagher MD, James Goldstein MD, S. Almany MD, M. Shoukfeh MD, A. Bilolikar MD, T. Bowers MD, S. Ajluni MD, S. Dixon MD, R. Safian MD, I. Hanson MD, J. Trivax MD,

A. OBJECTIVES

1. Develop a relevant knowledge base and management skills for patients with acute myocardial infarction and its complications, as well as other acute critical care problems.
2. Develop skills pertaining to medical resident education and assist residents in attaining their educational objectives.
3. Triage patients into appropriate clinical research trials.
4. Develop an understanding of public health, legal and cost-effectiveness issues, and patient safety issues.
5. Develop cognitive skills in ECG interpretation, particularly as they relate to recognition of acute ischemia, myocardial infarction, pericarditis, and cardiac dysrhythmias.
6. Develop technical and cognitive skills in placing temporary pacemakers, Swan Ganz catheters, arterial lines, and IABPs.

B. TEACHING STRATEGIES

1. The CCU teaching service consists of the CCU teaching attendings (“Daily Rounder”), the patient’s attending cardiologist, the CCU fellow, and three residents.
2. Formal teaching activities are provided by the CCU teaching attending on a daily basis (except Sundays), as described in Section C below.
3. Supervised patient care is provided by the CCU teaching attending and by the patient’s attending cardiologist.
4. Other teaching strategies include required attendance:
 - a. monthly M&M conference
 - b. monthly Cardiology Grand Rounds
 - c. monthly Journal Club
 - d. weekly Cardiac Catheterization Conference
 - e. daily Noon Conference
5. Fellows are expected to utilize other web-based services through the Beaumont Medical Libraries to access ACC/AHA Practice Guidelines and other resources (see Section D, Systems-Based Practices).

C. ATTENDING PHYSICIAN SUPERVISION & RESPONSIBILITIES

The CCU Medical Director (or designate) will:

1. Identify the CCU teaching faculty.

2. Enforce unit policies.
3. Review each fellow's credentialing log on a monthly basis to ensure its completion and accuracy.
4. Address deficiencies in fellows' performance with the CCU monthly rounder and the Program Director.
5. Meet with the CCU fellow at the beginning of the monthly rotation to verbally review the goals, objectives and responsibilities for the upcoming month. The fellowship coordinator will maintain a signature log confirming that this meeting has occurred.
6. Meet with the CCU fellow at the end of the monthly rotation to verbally review the fellow's written evaluation and performance.

CCU Teaching Attending will:

1. Serve as the primary resource for the fellow regarding patient management and triage decisions (*the patients primary cardiology attending remains the physician of record*).
2. Direct morning rounds with the medical residents, fellow, nurses, and pharmacist at 7:30 am (Monday - Friday) on all new admissions and patients with active management issues.
3. Available to the fellows as a resource for management questions throughout the day (does not have to be on-site).
4. Review the fellow and residents' case presentations, review and constructively critique the fellow's plan of care, review and confirm diagnostic studies that require attending level input, and confirm the plan for patient management decisions.
5. When necessary, directly communicate with primary cardiologist regarding emergent or urgent management issues.
6. The CCU teaching attending, together with the fellow, will be jointly responsible for the core curriculum teaching as required for education of the house staff (didactic lectures, daily teaching on patient care related issues, etc)

Primary Cardiologist expectations:

1. Evaluate all patients on their service in the CCU by 10 am.
2. Discuss management plan with the cardiology fellow and/or resident by 10 am.
3. Directly call the CCU team regarding new admissions or transfers to the CCU
4. Review the fellow's plan of care, confirm physical exam findings, and review and confirm the medical residents' and/or fellow's progress notes.

D. CCU FELLOW RESPONSIBILITY

1. Serves as the primary cardiology physician for each patient admitted to the CCU teaching service (personally evaluate all new admissions).

2. Responsible for all aspects of acute and continuing care of all patients admitted to the CCU teaching service (from admission until transfer or discharge).
3. Responsible for the supervision of medical residents assigned to CCU patients.
4. Coordinates and supervises daily management work rounds with medical residents and CCU teaching staff (7:30 am rounds, Monday - Friday).
5. Coordinates and supervises daily PM rounds with the medical residents (3:00 pm rounds, Mon-Friday)
6. Fellow will pre-round on any critically ill patients and discuss significant patient management issues from overnight with the post call team.
7. The fellow will coordinate management of all patients admitted to the CCU teaching service and discuss patient management issues on a daily basis with the attending physician of each CCU patient on the teaching service (by 10 am).
8. Responsible for invasive procedures in the CCU.
9. The fellow, together with the attending, will be jointly responsible for the core curriculum teaching as required for education of the house staff (didactic lectures, daily teaching on patient care related issues, etc).
10. All critically ill patients and any issues that need follow up overnight will be checked out to the on-call fellow in a detailed manner.

Specific Responsibilities include:

PATIENT CARE

1. Review the care provided to each CCU patient daily with each resident.
2. Assess each new CCU admission promptly, and write an admission note on each new patient with acute MI.
3. The fellow is responsible for all invasive cardiac procedures including arterial lines, pulmonary artery catheters, temporary pacemakers, balloon pumps, central venous lines, and the removal of arterial lines. (Note the policy regarding the credentialing process in Section F). At the discretion of the fellow, qualified residents are encouraged to perform procedures, but patient care remains the responsibility of the fellow and attending physician.
4. After hours, the CCU fellow may be called to assist with emergency echocardiograms in the hospital or EC. An attending physician must provide on site interpretation. Emergency TEE will only be performed with an attending physician (see emergency schedule). The CCU fellow will not provide after-hours interpretation of non-emergent echos in the EC, ICUs, or other areas, without immediate on-site attending supervision.
5. All ECGs on CCU patients should be read by the fellow. The attending CCU rounder will review these each morning on rounds.
6. The fellow should discuss patient management issues on a daily basis with the attending physician.
7. Night-call responsibilities must be performed in-house for the first four months of the academic year for 1st Year fellows. After 24 hours of continuous in-hospital clinical activity, the CCU fellow will not be permitted to admit new patients or perform invasive procedures in the CCU, cath lab, or EP lab (duty-hour requirement). The fellow will be permitted to remain in-hospital

for an additional 4-hours, to transfer patient care, attend teaching conferences, and attend outpatient clinic (24 + 4 hour rule). At no time will any fellow remain in-hospital for more than 28 hours of uninterrupted activity. After the 1st four months, the fellow may take call from home. However, the fellow is expected to return promptly to the CCU for all acute MI admissions, procedures, and significant changes in patient status.

MEDICAL KNOWLEDGE

1. Demonstrate clear understanding of the pathophysiology of disease states for each patient.
2. Understand the indications, contraindications, risks, benefits and alternatives for noninvasive testing, invasive procedures, and pharmacological approaches to CCU patients with various acute and chronic cardiovascular problems.

PRACTICE-BASED LEARNING

1. Attend daily morning rounds with the attending CCU rounder and residents.
2. Identify the patient and materials to be presented at Professor Rounds.
3. Pull interesting echos from CCU patients for Tuesday Echo Conference (11:00 am – 12:00 Noon).
4. Be aware of all acute MI admissions and research protocols.
5. Give one didactic session per week to the residents on any topic of choice.
6. Inform medical residents of acute MI research protocols. All CCU patients must be screened by the fellow for entry into research protocols, and appropriate candidates may be entered into protocols following informed consent.

INTERPERSONAL & COMMUNICATION SKILLS

1. Conduct Sunday morning CCU rounds with the residents. Both on-call residents from Saturday and Sunday must attend Sunday rounds.
2. Sign-out rounds with resident and fellow must be conducted every afternoon to establish a plan for the night.
3. Provide daily communication (or more frequently if needed) with the patient and family to ensure understanding of patient progress.
4. Interact with medical house staff, nursing staff, and attending physician to strengthen the “team” approach, and to identify and resolve any problems that arise.
5. The fellow should discuss patient management issues on a daily basis with the attending physician.

SYSTEMS-BASED PRACTICE

1. Read, understand, and discuss ACC/AHA guidelines for patients:
 - a. with acute MI/acute ischemic syndromes
 - b. undergoing cardiac catheterization, percutaneous intervention, coronary artery bypass surgery, or electrophysiologic procedures in the CCU setting
2. Utilize web-based resources to enhance understanding of pathophysiology, patient evaluation, and pharmacological approaches to acute diseases. These resources include EPOCRATES,

UpToDate, MDCONSULT, and PubMed, and are available on all hospital computers via the Beaumont Medical Library.

PROFESSIONALISM

1. Always maintain a positive and professional attitude towards the patient, family, and referring physician.
2. Maintain regular and professional interactions with the nursing staff and attending physician.

E. RESIDENT RESPONSIBILITIES

Medicine residents have primary care responsibility for patients admitted to the Coronary Care Unit. The residents are responsible for the initial history and physical examination of patients admitted to the CCU, as well as development of a Problem List. The residents are responsible for formulation of a plan for evaluation and management for each problem. The residents continue to play a primary role throughout the patient's CCU stay.

F. EVALUATIONS

1. Each CCU fellow will be evaluated on a monthly basis as follows (360° Evaluation):
 - a. A monthly evaluation of the fellow will be completed by the CCU Rounder using the web-based system New Innovations. The content of the evaluation will be reviewed verbally with the fellow at the end of the month. Specific deficiencies will be forwarded to the Program Director. Monthly evaluations of the fellow will also be performed by the Chief fellow, the residents on the CCU rotation, and the Nurse supervisor in the CCU. The fellow will also evaluate his/her performance in the context of the objectives and responsibilities.
 - b. The credentialing process, as outlined in section F, must involve a bedside evaluation by an attending cardiologist of each fellow's performance prior to signing the form. At the end of the month, this form must be verified by the CCU Medical Director and filed with the Fellowship Coordinator.
2. The CCU fellow will complete an evaluation of the CCU rounder(s) each month, using New Innovations. This evaluation will be reviewed on an annual basis with the Program Director and the Chief of Cardiology.

G. CREDENTIALING PROCESS

The purpose of the credentialing process for invasive procedures in the CCU is to ensure quality care and to provide documentation that teaching objectives have been achieved. The credentialing process is as follows:

1. Each procedure will be performed under direct supervision of an attending cardiologist, interventional fellow, or EP fellow as early as possible in the first fellowship year. The attending cardiologist should sign the signature line for the procedure.

2. Procedures may be completed by the fellow without immediate supervision only after the credentialing process has been satisfactorily completed for three procedures. In addition, the CCU Director must review and verify the procedure log before the fellow can perform that procedure without attending supervision.
3. Fellows who have not been credentialed in a procedure may participate in a procedure only with an attending cardiologist, interventional fellow, or EP fellow as supervisor. Please see the credentialing sheet appended to the description of the CCU rotation.

At the end of the month, the signed credentialing log must be submitted to the Fellowship Coordinator. A copy will be maintained in the fellow file.

**CCU FELLOW ROTATION
CREDENTIALING SHEET FOR INTRAVASCULAR PROCEDURES**

FELLOW NAME: _____

MONTH OF ROTATION _____

<u>PROCEDURES</u>	SIGNATURE #1	SIGNATURE #2	SIGNATURE#3	CCU DIRECTOR
*Radial A. Line	_____	_____	_____	_____
Femoral A. Line	_____	_____	_____	_____
*I.J. Venous Access	_____	_____	_____	_____
Femoral V. Access	_____	_____	_____	_____
*Pulmonary Catheter	_____	_____	_____	_____
*Temporary Pacemaker	_____	_____	_____	_____
IABP Removal	_____	_____	_____	_____
Femoral A. Line Remova l	_____	_____	_____	_____
Subclavian V. Access	_____	_____	_____	_____

***THESE ARE REQUIRED PROCEDURES, WHICH MUST BE MASTERED IN THE CCU ROTATION**

THIS FORM HAS TO BE COMPLETELY FILLED OUT WITH ATTENDING SIGNATURES.

AT THE END OF THE ROTATION, THIS FORM MUST BE FILED WITH THE FELLOWSHIP COORDINATOR, AND A COPY MUST BE PLACED IN THE FELLOW'S FILE.

I VERIFIED THAT THE FELLOW HAS DEMONSTRATED PROFICIENCY IN PERFORMANCE OF THE ABOVE PROCEDURES.

STEVEN TIMMIS, MD
MEDICAL DIRECTOR, CCU

DATE

ECHOCARDIOGRAPHY ROTATION

Medical Director: A. Neil Bilolikar, MD
Teaching faculty: A. Abbas MD, N. Kerner MD, K. Chinnaiyan MD,
M. Gallagher, M. Shoukfeh, M. Stevens MD

A. OBJECTIVES FOR ECHOCARDIOGRAPHY

1. Acquire the skills to perform and interpret transthoracic (TTE), transesophageal (TEE), stress and intracardiac (ICE) echocardiography.
2. Understand the indications and limitations of all aspects of echocardiography.
3. Understand the indications, limitations, and appropriateness criteria for all echocardiographic modalities.
4. Correlate echocardiography findings with other noninvasive and invasive imaging modalities.
5. Understand basic principles of ultrasound transmission, instrumentation, and artifacts.
6. Understand basic principles and limitations of Doppler echocardiography including M-mode, pulse wave, continuous wave, color and Doppler, 2D.
7. Understand the basic echocardiographic views and anatomic correlates.
8. Understand how to quantify cardiac chambers, myocardial mass, and regional and global systolic function.
9. Understand how to evaluate cardiomyopathies.
10. Recognize how to utilize echocardiography to assess valvular heart disease, including valvular stenosis, valvular regurgitation, prosthetic valve function, and infective endocarditis.
11. Recognize how to utilize echocardiography to assess right heart hemodynamics, including right atrial pressure, right ventricular and pulmonary pressures, pulmonary hypertension, and pulmonary vascular resistance.
12. Recognize how to utilize echocardiography to assess diastolic function.
13. Recognize how to utilize echocardiography to assess pericardial diseases, including constriction, tamponade, and effusive constrictive pericardial diseases.
14. Recognize how to utilize echocardiography to assess cardiac diseases resulting from systemic causes, such as systemic illness, genetic diseases, medications, infection, trauma, and transplant rejection.
15. Recognize how to utilize echocardiography to assess adult congenital heart disease.
16. Recognize how to utilize echocardiography to assess intracardiac tumors and intracardiac masses.
17. Recognize how to utilize echocardiography to assess diseases of the great vessels, such as the aorta, pulmonary artery, pulmonary veins, and great veins.
18. Understand the role of stress echocardiography in the evaluation of ischemic heart diseases.
19. Understand the role of echocardiography in interventional cardiology, including TEE and ICE, for PFO/ASD closure, percutaneous valve implantation, left atrial appendage occlusion, and transeptal puncture.
20. Understand novel echocardiographic techniques, myocardial contrast perfusion echocardiography, tissue Doppler imaging, strain imaging, and speckle tracking.
21. Understand the role of echocardiography in electrophysiology, including dyssynchrony assessment and ICE for transeptal puncture, identifying pulmonary veins, and ablation.
22. Understanding the different modalities of 3D including x-plane, 3D zoom, live 3D, and full volume with TEE, as well as the benefit of volumetric analysis using 3D
23. Attending an intra-operative TEE session to be exposed to the incremental role of TEE in the OR.
24. Developing a manuscript/research/abstract during the echo rotation to be submitted at a conference, or a journal

B. TEACHING STRATEGIES

1. The Echo teaching service consists of one or more echo teaching attendings, one or more cardiology fellows, and teaching sonographers.
2. Fellows will receive an echo curriculum and handouts at the beginning of their first rotation.
3. Teaching sonographers and echo attendings will be designated during the rotation.
4. Fellows in the Echo rotation will receive direct, HANDS ON experience in the performance of echocardiography (TTE, stress and dobutamine echo, and TEE). Direct supervision during performance of TTE will be by teaching sonographers, and direct supervision during transesophageal echo (TEE) will be by Echo attending cardiologists.
5. The teaching sonographers are expected to designate and perform the “teaching cases” with the fellows.
6. Fellows will have an opportunity to independently interpret echo studies and review these studies with the Echo attending during face-to-face interactions. Interpretations for these studies will be reviewed by the Echo attending.
7. Fellows are required to attend a weekly echocardiography conference.
8. Fellows will utilize other outside resources to enhance self-education, including suggested reading on ultrasound physics, acquiring complete familiarity with the Handbook of Cardiac Ultrasound, manual of echocardiography, atlas of transesophageal echocardiography, and independent review of videotapes from the Mayo Clinic and Cleveland Clinic.
9. Fellows who are interested in pursuing advanced echo training will have the opportunity to be exposed to intracardiac echo and intraoperative echo. Their participation in a research is strongly recommended.
10. A digital teaching file for interesting cases will be developed for fundamental teaching points, rare cases, and research.
11. External rotations, core lectures, EchoSAP will be available to cover certain topics that may not be available at our institution.

C. ATTENDING PHYSICIAN RESPONSIBILITIES

1. The attending physician will ensure that fellows receive technical instruction and hands-on transducer experience on a daily basis. Attending will guide fellow in proper TEE and stress protocols. A minimum of 2 TTE cases performed by the fellow will be reviewed by the attending each day.
2. Formally review and critique the fellow's interpretation of at least 2 TTE studies daily.
3. Conduct daily (frequently twice daily) echo reading sessions to review and interpret completed studies. The attending must allow the fellow to interpret at least 5 studies per reading session.
5. Review all Dobutamine and stress echocardiograms with the fellow, emphasizing identification of subtle regional wall motion abnormalities.
6. Review all STAT echocardiograms performed by the fellow.
7. Organize weekly Echo Conference (every Thursday, 3:30 pm– 4:30 pm).
8. Ensure that teaching responsibilities are covered during vacations or other leaves of absence.
9. The Echo Lab Attending (or surrogate) will meet with the Echo fellow(s) at the beginning of the monthly rotation to verbally review the goals, objectives, and responsibilities for the upcoming month. The Fellowship Coordinator will maintain a signature log confirming that this meeting has occurred.
10. The Echo Lab Attending (or surrogate) will meet with the Echo fellow(s) at the end of the monthly rotation to verbally review the fellow’s written evaluation and performance, as documented in E*Value. The Fellowship Coordinator will maintain a signature log confirming that this meeting has occurred.

D. FELLOW RESPONSIBILITIES

RESPONSIBILITIES BY YEAR OF TRAINING

1. First year fellows will be instructed in 2-D echocardiogram and Doppler techniques and will observe transesophageal echo and intraoperative echocardiograms. They will participate in stress echocardiograms with the senior fellows and attendings. Some introduction to TEE (insertion of probe and beginning hands-on instructions) may be initiated during the 1st year. The main goal of the first year is to achieve the ability to independently perform a full TTE, in addition to understand the different echocardiographic modalities.
2. Second year fellows will receive additional instruction in the performance of TEE, intraoperative, and stress echo procedures. It will primarily be the responsibility of the 2nd year fellows to evaluate patients for invasive echo procedures. The main goal after completion of the 2nd year is to achieve significant expertise to qualify for Level I certification. Fellows interested in Level II certification will require more elective time in the Echo Lab in 2nd and 3rd years of training.
3. Third year fellows will further increase their basic skills in cardiac ultrasound, TEE and stress echocardiography. Those pursuing an advanced echocardiography, electrophysiology, or interventional cardiology career will be introduced to the application of intracardiac echo in their respective fields. Research projects are encouraged.

PATIENT CARE

1. Fellows will devote 100% of their time to the Echo Lab during their Echo rotation. Fellows may not leave the Echo Lab to do cases in the Cath Lab or EP Lab.
2. First and second year fellows will perform at least 5 TEE studies per day, under supervision of the echo attending and/or senior technician.
3. Prepare a complete formal, written interpretation of at least 2 TEE studies per day, which must be reviewed with the attending physician.
4. For other echo cases, fellows will review at least 5 echo studies per day, and present their findings and interpretations at the daily echo reading session.
5. Perform a brief history and physical on all patients on whom they perform an echo study, (TTE and TEE) and assist the technicians in examining other patients as necessary.
6. Perform emergency echo studies as deemed necessary by a cardiology attending. These emergency studies must be reviewed immediately with the attending physician. Fellows should not perform or interpret emergency echo studies in the hospital or Emergency Center, unless under the direct and immediate supervision of a Cardiology attending. Unsupervised fellow "readings" are prohibited.
7. Fellows involved with TEE's are responsible for dictating the report after reviewing the studies with the attending.
8. Emergency TEEs (after hours and/or weekend) may be performed by fellows only when the attending is present during the procedure.

MEDICAL KNOWLEDGE

1. Acquire basic understanding of ultrasound physics (see suggested reading).
2. Maintain a log of echo procedures as required by the American Board of Internal Medicine. This echo log will serve as the basis for procedure credentials as defined in Section E (below).
3. Fellows must be completely familiar with and follow specific instructions in the Handbook of Cardiac Ultrasound (to be distributed during the Echo Rotation).
4. Understand the indications, contraindications, risks, benefits, and alternatives for all echo imaging techniques.
5. Fellows will be required to perform and interpret goal-directed TTE, TEE, and stress echos.

PRACTICE-BASED LEARNING

1. Participate in a weekly cardiac ultrasound conference (Tuesday, 11–12 Noon).
2. Utilize echo studies during their case presentations for other Cardiology conferences.

INTERPERSONAL & COMMUNICATION SKILLS

1. Perform a brief history and physical on all patients on whom they perform an echo study, and assist the technicians in examining other patients as necessary.
2. Provide a complete explanation to the patient about the risks, benefits, and alternatives to various echo procedures, if appropriate.
3. Alleviate patient anxiety about invasive echo procedures, and explain what measures will be employed to eliminate pain, discomfort, and anxiety.
4. Provide immediate feedback to the patient's attending cardiologist when STAT interpretations are needed.
5. Interact with Echo attendings and paramedical staff to strengthen the "team" approach, and to identify and resolve any problems that arise.
6. For advanced echo techniques such as TEE and Dobutamine echo, a senior fellow will be available to assist junior fellows.

SYSTEMS-BASED PRACTICE

1. Read, understand, and utilize ACC/AHA guidelines and appropriateness criteria for TTE, TEE, and stress echo.
2. Utilize web-based and hospital-based resources to enhance self-study of echocardiography.
3. Suggested reading and videos:
 - The echo manual, third edition, Oh, Seward, Tajik, Walters Kluer, 2006
 - Echocardiography, 6th edition, H Feigenbaum and Lea and Febiger, 2004
 - The Practice of Clinical Echocardiography. 3rd edition. C Otto. WB Saunders, 2007.
 - Atlas of intraoperative transesophageal echocardiography Oxron, Oto Saunders 2007
 - Principles and Practice of Echocardiography. 2nd edition A Weyman, Lea and Febiger. WB Saunders, 1996.
 - AcuNav Diagnostic ultrasound catheter: ICE instructional guide
 - Mayo Clinic videotape series.
 - Invasive Echocardiography tape series from Cleveland Clinic.
 - Diastology tape series from the Cleveland Clinic.

PROFESSIONALISM

1. Always maintain a positive and professional attitude towards the patient.
2. Maintain professional interactions with the nursing staff, technicians, and physicians.

E. EVALUATIONS

1. Each Echo fellow will be evaluated at the end of the Echo rotation as follows (360° Evaluation):
 - a. A monthly evaluation will be completed by the Echo attending(s) using the web-based system New Innovations. The content of the evaluation will be reviewed verbally with the fellow. Deficiencies

must be forwarded to the Program Director. The Chief Fellow and the senior Echo technician will also perform monthly evaluations of the Fellow. The fellow will also evaluate his/her performance in the context of the objectives and responsibilities of this rotation.

- b. Dr Amr Abbas must sign the procedure-credentialing log at the end of the month, and a copy of the form must be filed with the Fellowship Coordinator.
2. The Echo fellow(s) will complete a written evaluation of the Echo attending(s) each month using New Innovations. This evaluation will be reviewed on an annual basis with the Program Director and Chief of Cardiology

F. CREDENTIALING FOR PROCEDURES (must be documented in log).

1. Fellows will be able to provide preliminary STAT TEE interpretations after satisfactory completion of 100 TTE. All STAT echo studies must be immediately supervised and reviewed by an attending cardiologist.
2. Fellows will be able to provide preliminary STAT TEE interpretations after 100 TEE's under attending supervision. All STAT TEE studies must be immediately supervised and reviewed by an attending cardiologist.
3. Fellows will not provide preliminary interpretations of stress echocardiography.
4. At the end of the month, the credentialing log must be signed by Dr. Amr Abbas and then submitted to the fellowship coordinator. A copy will be retained in the fellows' file.

	Cumulative duration of training	Minimum total number of examinations performed	Minimum number of examinations interpreted
Level 1	3 months	75	150
Level 2	6 months	150	300
Level 3	12 months	300	750

TEE component	Objective	Minimum case load
Level 2 TTE	Basic skills	See above
Esophageal intubation	TEE probe introduction	25
TEE exams	Skills in performance and interpretation	50

Stress Echocardiography:

1. Understanding the basic principles, indications, applications, and technical limitations of echocardiography.
2. Level 2 TTE
3. Performance and interpretation of 100 stress studies by a level 3 echocardiographer

CLINICAL CARDIAC ELECTROPHYSIOLOGY SERVICES ROTATION

Director: David Haines MD
Teaching Faculty: James Stewart MD, Brian Williamson MD, Ilana Kutinsky MD, David Nori MD

A. OVERVIEW

The Clinical Cardiac Electrophysiology (CCEP) Services rotation is designed to provide the clinical fellows with an integrated experience and progressive responsibility. In order to accomplish that goal, the 3-month experience has been divided between Academic Heart and Vascular group (supervising faculty for first 6 months of the academic year), and Northpointe Cardiology (supervising faculty for the second 6 months of the academic year). Regardless of the supervising faculty, fellows will participate in inpatient activities (CCEP consult service and CCEP laboratory activities) and outpatient activities. These experiences will focus on developing cognitive and technical skills for the diagnosis and management of patients with arrhythmias, and those at risk of sudden cardiac death.

B. OBJECTIVES

Clinical Objectives

1. Evaluate and treat patients with cardiac arrhythmias with focus on VT, VF, sudden death risk assessment, atrial fibrillation, SVT, and device therapies (ICD/PPM).
2. Understand indications, limitations, and complications of temporary and permanent cardiac pacing.
3. Understand indications, limitations, and complications for EP studies and ablative treatment.
4. Understand ability of EPS to predict/detect clinical arrhythmias, and be able to interpret basic EP Studies.
5. Understand anatomy/physiology of normal and diseased cardiac conduction system.
6. Understanding/interpret all scalar modalities including ECG, DCG's (Holter monitors), and signal averaged ECG's.
7. Understand the mechanism, use, and toxicology of antiarrhythmic drugs.
8. Understand the indication for and interpretation of tilt table testing.
9. Understand the indications, risks, and methods of cardioversion.
10. Understand the results and implications of major clinical arrhythmia and pacing trials.
11. Understand the interpretation of stress ECGs.

CCEP Laboratory Objectives

12. Learn the techniques of electrode catheter placement for EP testing.
13. Perform and interpret diagnostic EP studies.

C. TEACHING STRATEGIES

1. The CCEP teaching service consists of one or more CCEP teaching attendings, one advanced CCEP fellow, and one or more CCEP clinic fellows.
2. Formal teaching activities are provided by the CCEP teaching faculty on a daily basis, as outlined in Section D below.

3. CCEP teaching strategies are focused on four general areas:
 - a. evaluation and treatment of inpatients with a variety of electrophysiological problems
 - b. evaluation and treatment of outpatients with a variety of electrophysiological problems
 - c. performance and interpretation of noninvasive studies (ECG, DCG, SAECG), invasive studies (EPS), EP ablations, and device therapy (PPM, AICD).
 - d. Recognition, management and pharmacotherapy of cardiac dysrhythmias.
4. Inpatient and outpatient care, performance of noninvasive and invasive procedures with recognition and management of dysrhythmias directly supervised by the CCEP attending.
5. Other teaching strategies include required participation in weekly EP conference, and preparation of a formal didactic presentation on an EP topic.
6. Fellows are expected to utilize web-based services through the Beaumont Medical Libraries to access ACC/AHA Guidelines and other useful resources.
7. Several EP textbooks and manuals of ECG interpretation are available for self-study.

D. ATTENDING RESPONSIBILITIES

Supervision of All Fellows

1. Conduct the Monday Noon Conference (Electrophysiology).
2. Provide formal ECG reading sessions on Monday, Thursday and Friday from 9:00 am to 10:30 am. These sessions will include formal interpretation of stress ECG.
3. Supervise a weekly outpatient teaching session in the Heart Rhythm Clinic (half-day).
4. Review and correct the fellows' ECG, DCG, and signal average ECG reports.
5. Review the results of diagnostic electrophysiology studies with the fellow. A variety of specific arrhythmia mechanisms will be discussed in this context.
6. The EP attending will meet with the EP fellow at the beginning of the rotation to verbally review the goals, objectives and responsibilities for the upcoming month. The fellowship coordinator will maintain a signature log confirming that this meeting has occurred.
7. The EP attending will meet with the EP fellow at the end of the monthly rotation to verbally review the fellow's written evaluation and performance. The Fellowship Coordinator will maintain a signature log confirming that this meeting has occurred.
8. Supervise inpatient electrophysiology consultations. No more than 4 new patients will be assigned on a daily basis, and patients assigned to the fellow will be selected for their educational value. It is the responsibility of the EP attending physician to ensure that the fellow is exposed to a variety of EP consultations with high educational value, and eliminate fellow consults for "service". Responsibilities to see inpatient consults will be superseded by responsibilities to attend required conferences and weekly outpatient continuity clinic.

Supervision of CCEP Laboratory Fellows

9. Supervise fellow activities during invasive electrophysiological studies. This will include gaining vascular access, positioning diagnostic electrode catheters in the heart, and pacing the heart through an external pacer. Fellows selecting a career pathway in Clinical Cardiac Electrophysiology may also gain experience in performing programmed electrical stimulation, catheter manipulation during catheter

ablation procedures, intracardiac echocardiography and transseptal catheterization. Each fellow should participate in a minimum of 3 invasive studies per week.

10. Supervise fellow activities during pacemaker procedures. Unless fellows have committed to a full course of training in CCEP or pacemaker implantation, activities during device implantation will be limited to observation of the surgical technique and device testing through the external programmer/analyzer.
11. Review the tilt table tests with the fellow.

E. FELLOW RESPONSIBILITIES

All patients referred for electrophysiological consultation are eligible for evaluation by the fellows. Such patients include, but are not limited to, those with simple and complex cardiac dysrhythmia; syncope; and disorders requiring invasive EPS, pacemaker or ablation.

SPECIFIC RESPONSIBILITIES:

PATIENT CARE

1. Evaluate/follow patients admitted to the EP attendings for EPS, pacemakers, cardioversions, and ablations.
2. Attend the weekly outpatient clinic in the Heart Rhythm Center (half-day).
3. Perform inpatient arrhythmia consultations and follow-up. A maximum of 4 new consultations may be performed per fellow per day. Responsibilities to see inpatient consults will be superseded by responsibilities to attend mandatory conferences, and weekly outpatient continuity clinic.
4. Participate in at least 3 EP studies weekly, including gaining vascular access, positioning diagnostic electrode catheters in the heart, and pacing the heart through an external pacer. During and after the procedure, the fellow should analyze the tracings and gain an understanding of the specific arrhythmia mechanisms that were identified.
5. Observe permanent pacemaker and ICD procedures, and perform device testing through the external programmer/analyzer under staff supervision.
6. Over the three month rotation, fellows are expected to document participation in: PPM(≥ 5), ICD (≥ 5), basic EP (≥ 15), EP with RFA (≥ 8), NIPS (≥ 8), and tilt tests (≥ 5). A log **MUST** be maintained and turned in to Dr. Haines at the end of your final month of EP training.
7. The expected progression of responsibility for invasive CCEP procedure/training is:
First month of rotation: 5 basic EPS, 1 EP with RFA, 1 PPM, 1 ICD, 2 NIPS
Second month of rotation: 5 basic EPS, 3 EP with RFA, 2 PPM, 2 ICD, 4 NIPS
Third month of rotation: 5 basic EPS, 3 EP with RFA, 3PPM, 3ICD, 3 NIPS

MEDICAL KNOWLEDGE

1. Demonstrate detailed understanding of the pathophysiology of cardiac dysrhythmias and sudden cardiac death.
2. Develop thorough understanding of the pharmacology of anti-arrhythmic drugs, as well as appropriate indications for, and contraindications against their use.

3. Study ACC/AHA guidelines for evaluation and treatment of patients with dysrhythmias, and risks, benefits, and alternatives for noninvasive and invasive EP procedures, EP ablations, and EP device therapy.

PRACTICE-BASED LEARNING

1. Prepare a 20-minute talk for 1 EP conference/month.
2. Interpret 10 intracardiac tracings per week and review these with the attending.
3. Attend weekly EP conference (Monday-noon).

INTERPERSONAL & COMMUNICATION SKILLS

1. Offer the patient and family a thorough explanation of the purpose, risks, benefits, and alternatives of various EP noninvasive and invasive procedures, as indicated.
2. Provide at least daily communication with hospitalized patients and family to discuss patient progress.
3. Interact with nursing staff, technicians, and other physicians to strengthen the “team” approach and resolve any problems that arise.

SYSTEMS-BASED PRACTICE

1. Study ACC/AHA guidelines for evaluation and treatment of patients with dysrhythmias, and risks, benefits, and alternatives for noninvasive and invasive EP procedures, EP ablations, and EP device therapy.
2. Utilize web-based and hospital resources to enhance understanding of pathophysiology, and patient evaluation and treatment.

3. SUGGESTED READING

- a. Cardiac Pacing and Electrophysiology, EL-Sherif and Samet.
- b. Cardiac Electrophysiology, Zipes and Jaliffe.
- c. Clinical Manual of Electrophysiology, Singer and Kupersmith.
- d. PACE, published monthly
- e. Clinical Cardiac Electrophysiology, Josephson.
- f. Practice of Cardiac Pacing, Furman.

PROFESSIONALISM

1. Always maintain a positive and professional attitude toward the patient and family.
2. Maintain professional interactions with physicians, technicians, and nursing staff.

F. EVALUATIONS

1. Each fellow is to be evaluated on a monthly basis at the end of the EP rotation, as follows (360° Evaluation):
 - a. A formal evaluation will be completed by the EP attending(s), using New Innovations, and the content of the evaluation will be reviewed verbally with the fellow. Deficiencies will be forwarded to the Program Director. Monthly evaluation of the clinical fellow will also be obtained from the Chief Fellow, the advanced EP fellow, and the Nurse supervisor in the EP lab. The fellow will

also evaluate his/her performance in the context of the objectives and responsibilities for this rotation.

- b. EP Attending must sign the procedure credentialing log at the end of the month, and a copy of the form must be filed with the Fellowship Coordinator.
 - c. On a yearly basis, a written ECG examination will be given to all fellows. Dr. Haines (or surrogate) will review the results of the exam with each fellow and a copy of the exam will be retained in the fellows' files.
2. At the end of the rotation, the EP fellow(s) will evaluate the EP attending using New Innovations.

G. CREDENTIALING

1. Fellows may be credentialed to implant permanent pacemakers if they meet proficiency requirements during their electrophysiology rotations. In order to be credentialed to implant dual chamber pacemakers, the fellow must participate in a minimum of 50 primary implants, twenty system revisions, and one hundred pacer clinic visits. A record of these cases should be maintained by the fellow and approved by Dr. Haines.
2. Fellows must demonstrate understanding of pacemaker history, basic sequence device technology, troubleshooting etc.
3. In addition to surgical skills, fellows seeking credentialing in permanent pacemaker implantation are expected to reach a level of expertise sufficient to pass the NASPE exam on special competence prior to completion of training. These requirements cannot be satisfied during the first and second year rotations and will require elective time in the third year (minimum of three months).
4. Fellows rotating through the EP service will not be credentialed to perform EP procedures, ICD implantation or RF Ablation. This requires a fourth year of EP fellowship training.
5. Fellows must maintain a log of invasive and non-invasive procedures, including ECG, DCG, SADCG, EPS, pacemakers, ICDs and ablations. Dr. Haines must sign the procedure log at the completion of the rotation, and a copy of this log must be filed with the Program Coordinator.

HEART STATION/ELECTROCARDIOGRAPHY

Teaching Faculty: James Stewart MD, David Haines MD

A. OBJECTIVES FOR HEART STATION

1st Year Fellows:

1. Understand basic principles of ECG interpretation, and recognize normal and variant ECG patterns.
2. Understand basic principles of arrhythmia interpretation.
 - a. supraventricular tachycardia (sinus tachycardia, atrial tachycardia, paroxysmal supraventricular tachycardia, atrial flutter, and atrial fibrillation)
 - b. ventricular tachycardia (monomorphic, polymorphic, torsade de pointes)
 - c. differential diagnosis of wide QRS complex tachycardia.
3. Diagnose conduction disturbances and heart block.
 - a. right bundle branch block, left bundle branch block, intraventricular conduction delay, fascicular blocks
 - b. 1st degree, 2nd degree, 3rd degree heart block.
4. Identify ECG abnormalities secondary to electrolyte disturbances, metabolic abnormalities, and drug effects.
5. Recognize the ECG patterns of atrial abnormalities and conduction disturbances; left and right ventricular hypertrophy; myocardial injury, ischemia, and infarction; and ECG interpretation in the presence of single and dual chamber pacemakers.
6. Interpret ambulatory ECG recordings (DCG, event recorders) under faculty supervision.
7. Interpret ECG tracings under faculty supervision.

2nd Year Fellows:

1. Develop a more advanced understanding of all “year 1” topics.
2. Understand the mechanisms and diagnosis of supraventricular AV Nodal re-entry tachycardia, circus movement tachycardia, atypical patterns of atrial flutter and pre-excitation, and ventricular tachycardia (idiopathic, right ventricular outflow tract, Brugada, and long QT syndromes).
3. Develop advanced skills in pacemaker ECG interpretation.
4. Interpret stress tests (exercise, pharmacologic) under faculty supervision.

B. TEACHING STRATEGIES

1. The Heart Station/ECG service consists of the Heart Station attending, the Heart Station fellow and the Clinical EP fellow.
2. Formal teaching activities are provided by the Heart Station attending as outlined in Section C below.
3. ECG teaching strategies are focused on the interpretation of 12-lead electrocardiograms and related ambulatory recordings (DCGs, event recorders).
4. ECG interpretation skills are acquired through a combination of didactic instruction; reading daily ECG tracings that are subsequently reviewed with the ECG attending; and use of self-study materials that include one or more materials as outlined in Section C(4) and Section D(4) below.

C. ATTENDING PHYSICIAN RESPONSIBILITIES

1. Provide formal ECG reading and didactic teaching sessions twice weekly. These are group sessions with the Heart Station Fellow, clinical EP fellow and the attending and will include review of interesting tracings chosen by the attending or fellows.
2. Supervise interpretation of 40 ECGs (randomly selected) daily Monday – Friday (total 200 per week). These will be reviewed by the heart station attending and reviewed with the fellow.
3. Supervise interpretation of ambulatory ECG recordings (DCGs and Event recorders).
4. Supervise interpretation of stress tests – review and discuss test interpretation.
5. Attending will meet with the fellow(s) at the beginning of each monthly rotation to review the objectives and responsibilities.
6. Attending will meet with the fellow(s) at the end of the month to verbally review the fellow(s)' evaluation and performance.

D. FELLOW RESPONSIBILITIES

MEDICAL KNOWLEDGE

This is a half – day rotation. Fellows are expected to read and interpret forty 12-lead ECGs per

day on a timely basis – such that adequate time remains to review the day’s tracings with the fellow.

Fellows will prepare weekly oral presentations (20-30 minutes) on assigned ECG topics.

4. Fellows will be involved in independent review of self-learning educational modalities, including ECG Tutor CD (Dreifus), Fellowship Coordinator has a copy for each fellow), and ECG in Emergency Decision Making (Wellens and Conover), electrocardiography in Clinical Practice (Surawicz).
5. Fellows are expected to meet the COCATS level 1 – preferably level 2- reading requirement for Holter monitor studies. .
6. Fellows are expected to meet the COCATS level 1 – preferably level 2 – reading requirements for Stress test interpretation.

PRACTICE-BASED LEARNING

1. In the context of other division-wide conferences, such as M&M and Cath Conference, fellows will incorporate ECG interpretation into the decision-making process for patient care.

INTERPERSONAL & COMMUNICATION SKILLS

1. Interact with ECG technicians and other fellows and faculty, to promote easy transfer of ECG information, especially if STAT ECG interpretations are required.

SYSTEMS-BASED PRACTICE

1. Fellows will be involved in independent review of self-learning educational modalities, including ECG Tutor CD (Dreifus), Fellowship Coordinator has a copy for each fellow), and ECG in Emergency Decision Making (Wellens and Conover). Cardiac Pacing & ICD’s (Ellestad) and Electrophysiologic Testing (Fogorus).

PROFESSIONALISM

1. Always maintain a positive professional attitude in dealing with ECG technicians, paramedical staff, nurses, and physicians.

E. EVALUATIONS

1. Fellows will evaluate the Heart Station attending on a monthly basis. This evaluation will be performed using the web-based New Innovations, and will be reviewed by the Program Director and the Chief of Cardiology.
2. Fellow evaluations will be based on:
 - a. Observation of ECG interpretation skills.

- b. Observation of ambulatory ECG and exercise ECG interpretive skills.
- c. Evaluation of assigned oral presentations.
- d. Attending will meet with the fellow(s) at the end of the month to verbally review the fellow(s)' evaluation and performance.
- e. The Heart Station attending physician will complete a formal evaluation of the fellow in New Innovations.
- f. The fellow will also evaluate his/her performance in the context of the goals and responsibilities for this rotation.

F. CREDENTIALING

No credentialing is necessary.

CARDIOLOGY CLINICAL (IN-PATIENT) SERVICE ROTATION

Director: James Goldstein, MD
Teaching Faculty: R. Safian MD, G. Hanzel MD, S. Dixon MD, P. Marcovitz MD, K. Chinnaiyan MD, David Haines MD, Neil Bilolikar, MD, Anna Marandici MD, Elvis Cami MD
Clinical Team: Cardiology Attending Physician, Clinical Cardiology Fellow, 2 Nurse Practitioners (Carla Justice, Jim Colar), Medical Resident(s), Medical Student(s)

A. OBJECTIVES

1. Acquire skills for bedside physical examination pertinent to the cardiovascular system.
2. Write, present, and dictate a concise and well-focused cardiology consultation.
3. Understand the fundamentals of ECG interpretation, arrhythmia identification and management.
4. Understand the indications, limitations, and application of echo, CMR, CT, nuclear, and other noninvasive imaging modalities as they apply to the evaluation of patients with a wide variety of cardiovascular disorders (ischemic heart disease, valvular disease, cardiomyopathy, peripheral vascular disease, cardiac rhythm disturbances, etc).
5. Understand indications, limitations, complications of invasive diagnostic and therapeutic cardiac, endovascular and electro-physiologic modalities.
6. Perform a thorough cardiovascular evaluation for pre-operative clearance.
7. Identify and manage post-operative cardiovascular complications.
8. Implement recommendations for risk-factor modification.
9. Understand how to evaluate and manage patients with a variety of cardiovascular, peripheral vascular, and electrophysiological problems.

B. TEACHING STRATEGIES

1. The Cardiology Clinical In-patient Service will consist of one Cardiology teaching attending, one clinical cardiology fellow, two nurse practitioners, one or more medical residents, and one or more medical students
2. This is one of the busiest and most demanding clinical rotations because it incorporates virtually all aspects of hospital-based Cardiology practice, including primary patient care for cardiovascular patients, consultative cardiovascular care, preoperative evaluation and post operative care, utilization of all available noninvasive and invasive diagnostic and therapeutic modalities, and primary and secondary prevention of heart and vascular diseases.
3. The scope of potential learning opportunities is extremely broad, and includes all of the challenges that can be brought to bear in the care of patients with acute and chronic ischemic heart disease, structural and valvular heart disease, cardiomyopathy, acute and chronic rhythm disorders, and acute and chronic peripheral arterial disease (critical limb ischemia, renovascular disease, acute and chronic mesenteric diseases, cerebrovascular disease, aneurysmal diseases).
4. In order to meet the demands of such a broad array of patients, teaching strategies incorporate all potential teaching opportunities, including:
 - a. Structured attending rounds for 2 hours per day to allow detailed presentation of new patients, review of old patients, and a detailed, patient-oriented discussion led by the attending.
 - b. Patient management and care is oriented towards a team approach, and all members of the team will critically review and discuss the results of noninvasive and invasive diagnostic and therapeutic modalities.

- c. All patients will be seen and examined by the attending physician and at least one other member of the team, and salient points of the history and physical examination will be emphasized at the bedside.
- d. The cardiology fellow will gain experience as the team leader, under direct supervision of the attending. As such, the fellow will have considerable independence in patient evaluations, family meetings, working with nursing and ancillary staff, ordering noninvasive studies, requesting consultations from other medical and surgical services, and supervising and direct participation in teaching medical students and house staff.
- e. Participation in all required Cardiology conferences, including daily noon conference, weekly cath conference, monthly M&M conference, and monthly Grand Rounds.
- f. Fellows are expected to review and implement appropriate guidelines for care and treatment of all cardiology and vascular problems. Formal guidelines from ACC, AHA, SVS, ACP, etc are available from web-based resources in the Beaumont Medical Library. Other web-based resources are excellent sources for self-study, and include EPOCRATES, UpToDate, and MDConsult.

C. ATTENDING RESPONSIBILITIES

- 1. The attending must see each patient.
- 2. The attending must give at least one formal teaching session on a pertinent topic. This may be done in the context of Clinical Service teaching rounds, CCU teaching rounds, Professor rounds, or Noon conference.
- 3. Teach ECG and arrhythmia fundamentals.
- 4. Provide guidance on the indications, implications, complications, and limitations of noninvasive and invasive techniques.
- 5. Conduct daily afternoon rounds (1 – 2:30 pm) for the Clinical Service. To the extent possible, these rounds should focus on teaching and education, rather than “work rounds”.
- 6. The attending is expected to make the Clinical Service activities a top priority. Other non-Clinical Service activities, such as cardiac cath lab and outpatient clinic activities, should be kept to a minimum, to prevent interference with activities on the Clinical Service. The attending is expected to make appropriate coverage arrangements for unanticipated absence.
- 7. The Clinical Service attending will meet with the fellow at the beginning of the rotation to verbally review the goals, objectives and responsibilities for the upcoming month. The Fellowship Coordinator will maintain a signature log confirming that this meeting has occurred.
- 8. The Clinical Service attending will meet with the fellow at the end of the monthly rotation to verbally review the fellow’s written evaluation and performance. The Fellowship Coordinator will maintain a signature log confirming that this meeting has occurred. The attending will also complete a formal evaluation of the fellow using E*Value.

D. FELLOW RESPONSIBILITIES

RESPONSIBILITIES BY YEAR OF TRAINING

- 1. 1st Year Fellows will be introduced to the basic aspects of busy hospital-based Cardiology practice. Emphasis will be placed on improving cardiovascular history and physical examination skills during bedside teaching rounds with the attending physician. 1st Year Fellows will present detailed history and physical findings on patients on the primary service and on the consult service. In addition, they will be required to supervise medical residents and students while performing history and physical examinations. 1st Year Fellows are expected to provide educational discussions with the medical residents and students on basic cardiology topics including electrocardiography, pharmacology, and hemodynamics.

2. 2nd Year Fellows will receive additional instruction on how to manage a hospital-based Cardiology practice. The inpatient service will be primarily managed by the 2nd Year Fellow. Fellows will be expected to incorporate and to explain the findings of noninvasive and invasive cardiac testing (ie. transthoracic and transesophageal echocardiography, stress testing, cardiac magnetic resonance imaging, and cardiac catheterization). In addition, the requirements of supervision and instruction of the medical residents and students will continue similar as a 1st Year Fellow. Expected lectures include supraventricular arrhythmias, ventricular arrhythmias, and advanced pharmacology.
3. 3rd Year Fellows will continue to increase their skills in managing a hospital-based Cardiology practice. There will be greater emphasis on the incorporation and utilization of ancillary testing. Continued lectures and instructions for the medical residents and students is mandatory.

PATIENT CARE

1. Distribute daily patient assignments among the Physician Assistant, medical resident(s), medical student(s) and fellow on the Service. (No more than 4 new patients per fellow per day). The fellow should work with the Nurse Practitioners to ensure that the responsibilities and patient assignments are not ambiguous, and that all patients are seen in a timely fashion.
2. Write or dictate a formal cardiology evaluation and review it with the attending physician. Fellows are responsible for writing daily progress notes on their patients, and for ensuring that accurate notes are written by the resident(s) and student(s).
3. Complete a thorough history and physical examination, create a reasonable differential diagnosis, and develop a care plan that is cost-effective.
4. Discuss the care plan and progress on each patient during attending rounds.
5. Respond appropriately to nursing staff in dealing with issues related to patient care.
6. Recognize the need to address psychosocial and financial issues, and enlist the support of appropriate hospital resources.
7. Obtain consultations from other medical and surgical services when indicated.
8. The fellow should meet with the interventional and CCU fellows who were on-call the previous night to identify new admissions and establish early care plans (need for stress tests, urgent cardiac catheterization, etc). The fellow should not hesitate to discuss these issues with the Clinical Service attending, even before formal rounds at 1:00 pm.
9. The fellow is responsible for ensuring the efficient and effective operation of the Clinical Service, under the supervision of the attending physician. The fellow is expected to be available from 7am to 7pm to respond to the clinical needs of the patients on the Service.
10. Follow post-op heart patients with the Clinical team.
11. During the month on the Clinical Service, the fellow will not have any night-call responsibilities from Sunday through Thursday. Moonlighting is permitted on B-service on Saturdays and Sundays, but no later than 10pm. Strict adherence to duty hour's policies is required. The fellow on the Clinical Service will not have any outpatient clinic responsibilities during that month (the co-fellow in clinic will cover), but the outpatient experience will be "made up" by covering clinic when the co-fellow is on the Clinical Service.

MEDICAL KNOWLEDGE

1. The knowledge base for management of the Inpatient Service is huge. The fellow is expected to demonstrate understanding of the pathophysiologic basis for diseases including:
 - a. acute coronary syndromes
 - b. acute myocardial infarction
 - c. chronic ischemic heart disease

- d. acute and chronic heart failure
 - e. atrial and ventricular tachyarrhythmias
 - f. cardiogenic shock
2. In addition, fellows are expected to master the approach to the diseases listed above with respect to:
 - a. pharmacologic treatment
 - b. noninvasive evaluation (ECG, echo, nuclear, CT, MR, etc)
 - c. invasive EP evaluation and device treatment
 - d. cardiac catheterization, angiography, and intervention
 - e. cardiovascular surgery, including CABG, valve replacement, valve repair, and surgical approaches to arrhythmia
 3. Fellows must master the principles of:
 - a. risk assessment and risk factor modification
 - b. cardiovascular pharmacology
 4. Fellows should acquire and begin to develop the knowledge base for other sophisticated cardiac and vascular disease, including:
 - a. peripheral arterial disease
 - b. stroke
 - c. pericardial disease
 - d. acute and chronic aortic diseases
 - e. non-atherosclerotic cardiac and vascular diseases
 - f. complex arrhythmia diagnosis and treatment
 5. Study and implement ACC/AHA guidelines as they relate to patients on the Inpatient Service.

PRACTICE-BASED LEARNING

1. Give a formal didactic presentation 2-4 times per week to the Clinical Service team. These presentations will be done in the context of the curriculum developed by the Cardiology fellows for the internal medicine house staff, and will include sessions on ECG interpretation, congestive heart failure, acute myocardial infarction, acute coronary syndromes, and valvular heart disease.
2. Participate in daily rounds with the Clinical Service team.
3. Attend all mandatory cardiology conferences, including monthly Cardiology Grand Rounds and M&M conferences, weekly Cardiac Catheterization conference, and daily Noon conferences. Fellows are welcome to participate in any and all other conferences, to the extent that these conferences do not interfere with patient care and Clinical Service rounds.

INTERPERSONAL & COMMUNICATION SKILLS

1. The Interventional fellow(s) are expected to manage patients who are admitted for intervention and are hospitalized for 24 hours after intervention. Exceptions will be worked out on a patient-by-patient basis. It is the responsibility of the Clinical Service fellow to resolve ambiguities with the Interventional fellow.
2. Daily communication with the patient and family (more frequently if needed) to keep them apprised of patient progress.
3. Interact with the house staff, nursing staff, and attending physician to strengthen the “team” approach, and to identify and resolve any problems that arise.
4. Urgent matters require immediate communication between the fellow and attending to ensure timely medical care and decision making.

SYSTEM-BASED PRACTICE

1. Fellows are expected to utilize a broad approach to expanding their educational goals, and while excellent resources are readily available among the teaching faculty, fellows are expected to review, study, master, and implement ACC/AHA guidelines in many areas, including:
 - a. acute MI, acute coronary syndromes
 - b. congestive heart failure
 - c. valvular heart disease
 - d. atrial fibrillation
 - e. cardiac catheterization and intervention
 - f. cardiac surgery
 - g. pacemakers and implantable devices
 - h. risk factor modification
2. Web-based resources provide high-quality information that is readily available on demand, and are accessible via all hospital computers and Beaumont Medical Libraries. These resources include EPOCRATES, UpToDate, MDConsult, and PubMed.

PROFESSIONALISM

1. Always maintain a positive and professional attitude towards the patient, family, and referring physician.
2. Maintain regular and professional interaction with the nursing staff and attending physician. It is important to try to incorporate the nursing staff into important decision-making, since nurses often have the most insight into the patient's needs.
3. Special attention needs to be paid to patients and their families when dealing with end-of-life issues. It is important to ensure that patients are treated with compassion, respect, and honor, and that they and their families do not feel abandoned. Many hospital resources are available, and patients and families should be encouraged to use them.

E. EVALUATIONS

1. Each fellow is to be evaluated on a monthly basis at the end of the Clinical Service rotation, as follows (360° Evaluation):
 - a. A formal evaluation will be completed by the Clinical Service attending(s) using New Innovations, and the content of the evaluation will be reviewed verbally with the fellow. Deficiencies must be forwarded to the Program Director. Fellows will be evaluated on a monthly basis by the Chief Fellow, the Chief Interventional Fellows, the Advanced EP fellow, the Medical residents, the Medical students, and by the Nurse practitioner on the Service. The fellow will also evaluate his/her performance in the context of the goals and responsibilities for the rotation.
 - b. On a yearly basis, the Fellows will take a written in-service examination on clinical cardiology and ECG interpretation, and will be expected to pass this examination.
2. The Clinical Service fellow(s) will complete a written evaluation of the Clinical Service attending(s) each month using New Innovations. This evaluation will be reviewed on an annual basis with the Program Director and Chief of Cardiology

F. CREDENTIALING FOR PROCEDURES

No credentialing process is necessary.

NUCLEAR CARDIOLOGY ROTATION

Co-Directors: Darlene Fink, MD and John Rydberg, MD

Teaching Faculty: H. Balon MD, P. Mahajan MD, J. Palka, DO, O. Wong, MD, D. Wu MD,

OBJECTIVES

1. To fully understand the indications, limitations, complications and contraindications for exercise testing (treadmill, pharmacologic, bicycle), myocardial perfusion imaging, thallium-201 myocardial viability studies, nuclear myocardial performance imaging (R/S MUGA studies), tomographic reconstruction, nuclear shunt studies, and cardiac PET evaluation for myocardial perfusion and myocardial viability.
2. To obtain fundamental knowledge of basic radiation physics and nuclear pharmacology, as it pertains to nuclear cardiology imaging.

TEACHING STRATEGIES

1. The Nuclear Medicine teaching rotation consists of one or more Nuclear Medicine teaching faculty, one or more cardiology fellows, and one or more Nuclear Medicine residents.
2. The teaching strategies in Nuclear Medicine consist of review and interpretation of nuclear medicine imaging studies, fellow participation in nuclear medicine conferences, and didactic lectures.
3. Fellows are expected to utilize self-study materials to enhance their educational experience, including CDs and textbooks.

ATTENDING PHYSICIAN RESPONSIBILITIES

1. Formally review myocardial perfusion studies, radionuclide ventriculogram (MUGA), PET scans, and other nuclear imaging studies with the fellow.
2. The attending physician must arrange appropriate coverage for teaching responsibilities in the event of vacations or leave from the hospital.
3. The nuclear attending (or designate) will meet with the cardiology fellow(s) at the beginning of the monthly rotation to verbally review the goals, objectives, and responsibilities for the upcoming month.
4. The nuclear attending (or designate) will meet with the cardiology fellow(s) at the end of the monthly rotation to verbally review the fellow's evaluation and performance. The attending will complete a formal evaluation of the fellow using the web-based system E*Value.

FELLOWS RESPONSIBILITIES BY MONTH OF TRAINING

1st Month in Nuclear Medicine

1. Read assigned/recommended chapters in nuclear cardiology textbooks and educational CDs.
2. Fellow will rotate at least 2 days through the Radiopharmacy for nuclear pharmacology training.
3. Fellow will rotate through the computer lab each week, for at least ½ day with Pat Harvey or one of the other computer room technologists.
4. Fellow will spend time with the Corporate Medical Physicist, Janice Campbell, PhD learning radiation safety aspects.
5. Fellow will present a correlative conference to nuclear medicine residents.

2nd Month in Nuclear Medicine

1. Continue reading assigned/recommended chapters in major nuclear cardiology textbooks and educational CDs.
2. Fellow is expected to be able to interpret and present cases independently, with review of indications and interpretation to the other rotating fellows and attending physicians.
3. Fellow should prepare at least 5 complete cases per month including evaluation of the patient, electrocardiogram, exercise test and image acquisition. The fellow will also perform computer reconstruction and analysis on each of the 5 cases and interpret the cases independently, with final presentation to an attending physician.
4. Fellow will rotate ½ day weekly through the computer lab for acquisition and computer processing training with one of the computer room nuclear medicine technologists.
5. Observe in Radiopharmacy - prep & dispensation of products.
6. Fellow will spend at least 2 mornings (6:30 am) observing/learning about camera QC with Stu Dees, QC/QA Coordinator.
7. Fellow will spend time in the Cardiac PET laboratory, with extra training in computer processing in the PET laboratory. He/she will begin interpretation of PET cases. The fellow is to become an integral part of PET myocardial perfusion imaging. He/she will be present for the administration of the radiotracer, performance of the stress test itself, the image acquisition and processing of it and finally the interpretation of the study.
8. Fellow will present a correlative conference to nuclear medicine residents.

3rd and 4th Months in Nuclear Medicine

1. Fellow will complete reading of educational materials (chapters/books and CDs).
2. Fellow will complete and prepare at least 10 nuclear cardiology cases during the 3rd month including 2 PET cases for presentation to the attending physician and other fellows. This will include patient history, electrocardiographic and other non-invasive testing interpretation, exercise testing interpretation, camera set-up and acquisition, computer acquisition and processing and final interpretation with dictation.
3. Present correlative conference to nuclear medicine residents each month.
4. Fellow will rotate a ½ day per week in the computer laboratory with additional training in computer acquisition and processing.

Patient Care

1. The fellow will be present for the administration of the radiotracer, the performance of the stress test, the image acquisition and processing of it and finally the interpretation of ERN (Exercise Radio Nuclide, Ventriculography studies), R/S MPI, PET MP images.
2. Fellows are responsible for emergency coverage of 8th floor exercise testing lab if the Echo fellow is unavailable.

Medical Knowledge

1. Fellows must understand the indications, contraindications, risks, benefits, and alternatives for all nuclear cardiology tests.
2. Fellows should have a basic understanding of nuclear physics, safe use of radionuclides, instrumentation, image processing, methods of quality control, and radiation safety.
3. Fellows must integrate nuclear data with other clinical information, and with findings of other noninvasive and angiographic studies.

Practice-Based Learning

1. The cardiology fellow should review/interpret at least 5 myocardial perfusion imaging studies per day. If the current studies are not available, the fellow should access completed studies from the computer system. The fellow is to review, interpret and then correlate their interpretation with the final report. If the interpretation is discordant, adjudication with the staff physician must occur.
2. The fellow should access completed studies from the computer system, and review, interpret and correlate their interpretation with the final report. If their interpretation is discordant, adjudication with the staff physician should occur.
3. The fellow will present one “correlative conference” per month for the nuclear medicine residents and rotating residents/medical students in the department at that time. The cases will include all imaging modalities utilized in the workup of the patient, e.g., MPI, cath, MRI, echo, etc.
4. The fellow should complete the task book given to him/her at the beginning of the rotation, which includes computer tutorials, sessions on imaging processing, nuclear pharmacy, and assigned reading.

Interpersonal & Communication Skills

1. The fellow will notify Jeannine Maciejewski the Nuclear Medicine Education Coordinator of the times that they have commitments that will prevent them from training in nuclear cardiology, i.e., cardiology clinic duties, required cardiology conferences, vacations, etc.
2. The fellow should provide brief cardiovascular historical information and the results of the ECG exercise portion of the study (if appropriate), and be able to offer his/her interpretations of the exercise/nuclear data.

Systems-Based Practice

1. Self-Study Materials
 - a. CDs
 1. Gated SPECT, Clinical Reference Guide, 2001, editor Gordon DePuey.
 2. Atlas of Nuclear Cardiology, editor Eugene Braunwold, 2003.
 3. Physician Evaluation Program, Myocardial Perfusion Imaging, 1999, SNM.
 4. Nuclear Cardiology, Self Assessment Questions and Case Review
 5. The Future of Nuclear Cardiology, 2007
 6. The Heart of Nuclear Cardiology: An Interactive Primer, 2002
2. Suggested Reading:
 1. Nuclear Cardiac Imaging, Principles and Applications, 2002.
 2. Essentials of Nuclear Medicine Imaging, 2005.
 3. Nuclear Cardiology, State of the Art and Future Directions, B Zaret, G Beller. 2nd edition, Mosby, 1999.
 4. Cardiac SPECT Imaging, G DePuey, E Garcia, 2nd edition, 2001.
 5. Nuclear Medicine Self-Study Program III, Topic 3 and 4: Cardiology, Cardiac PET Imaging, Congenital Heart Disease, E.H. Botvinick.
 6. Nuclear Medicine Self-Study Program III, Topic 5: Myocardial Perfusion Scintigraphy – Technical Aspects, 2001, E.H. Botvinick.
 7. Nuclear Medicine Self-Study Program III, Topic 6: Myocardial Perfusion Scintigraphy-Clinical Aspects, 2001, E.H. Botvinick.
 8. Nuclear Medicine Self-Study Program III, Topic 7-8: Radionuclide Angiography (Ventriculography): Equilibrium and First Pass Methods; Myocardial infarction: “ Infarct Avid” Scintigraphy. 2006, E.H. Botvinick.
 9. Nuclear Cardiology: The Basics. How to Set up and Maintain a Laboratory. F Wackers, W Bruni, B Zaret. Humana Press, 2004.

10. Nuclear Cardiology: Practical Applications. G Heller, R Hendel, McGraw-Hill, 2003.

Professionalism

1. The fellow must be present in Nuclear Medicine from 8:00 am – 5:00 pm on a daily basis if not assigned to another “commitment”.

EVALUATIONS

1. Each fellow will be evaluated on a monthly basis at the end of the nuclear rotation, as follows:
 - a. A formal evaluation will be completed by the nuclear attending(s) using New Innovations and the content of the evaluation will be reviewed verbally with the fellow. Deficiencies must be forwarded to the Program Director.
 - b. The procedure credentialing log must be signed by Drs. Fink or Rydberg at the end of the month, and a copy of the form must be filed with Eydie and the coordinator for the Cardiology Fellowship Program.
2. The cardiology fellow(s) will complete a formal evaluation of the nuclear attending(s) each month, using New Innovations. This evaluation will be reviewed on an annual basis with the Program Director, Chief of Cardiology, and by the Nuclear Medicine Program Director.

CREDENTIALING

Fellows must maintain a log of all exercise/nuclear studies. This log must be signed by Dr’s Fink/Rydberg at the end of the month, and a copy given to Eydie for filing. Routine nuclear certification is not provided; certification is possible for selected fellows who meet all eligibility criteria as delineated below:

Level II certification in accordance with the regulations of the Nuclear Regulatory Commission can be achieved by cardiology fellows wishing to practice Nuclear Cardiology after graduation. Likewise, cardiology fellows may prepare for the certification board of nuclear cardiology exam. The guidelines for eligibility for the CBNC are in Appendix A, and the COCATS guidelines for training in Nuclear Cardiology are in Appendix B. Fellows **can apply** to take the CBNC Boards after all four months of training in nuclear cardiology are completed.

The NRC (Nuclear Regulatory Commission) published its final rule for training of level II certification and alternate pathway before becoming recognized as an authorized user (AU) for the practice of nuclear cardiology.

Information regarding the certification board of nuclear cardiology is available at www.cbnc.org. This website also includes COCATS guidelines as well as web links to the nuclear regulatory commission.

Appendix A

2011 CERTIFICATION ELIGIBILITY REQUIREMENTS FOR CANDIDATES TRAINED IN THE UNITED STATES

(all criteria must be met to receive a U.S. certificate)

Requirement 1: Training/Experience in the provision of Nuclear Cardiology Services (Level 2 nuclear cardiology training, including 80 hours of Classroom and Laboratory Training (CLT) must be completed prior to submission of application)

Formal Training Pathway (effective as of 2009)

- Candidates must document Level 2 training in nuclear cardiology in accordance with the [ACCF/ASNC COCATS Guidelines in Nuclear Cardiology, Revised 2008](#) by providing a preceptor attestation letter. Training in nuclear cardiology must occur at a center that has an ACGME or AOA accredited training program in Cardiovascular Disease, Nuclear Medicine, or Radiology.
- All applicants must document Authorized User status or a minimum of 80 hours of Classroom and Laboratory Training (CLT) in radiation safety that meets the NRC topic requirements. Documentation may be a copy of the facility RAM license listing the applicant's name or a copy of a certificate of completion of an 80 hour CLT course that meet NRC topic requirements.
 - The CLT hours must have been taken no more than seven (7) years prior to the date of the exam for which an individual is applying. CLT must be repeated if more than 7 years have elapsed since initial CLT and the applicant is not an Authorized user. Classroom and Laboratory Training (CLT) may be taken externally from the fellowship program.
 - If CLT hours were taken directly within the fellowship program, the preceptor must state this in the preceptor attestation letter by including the sentence "Dr. _____ completed a minimum of 80 hours of Radioisotope Handling Classroom and Laboratory Training which meets the requirements of the Nuclear Regulatory Commission within his/her fellowship program". If using the online [preceptor letter template](#) the box that states that this part of training was completed as an "integral" part of the fellowship should be checked.
- A [preceptor attestation letter](#) must be provided from an individual who can verify the candidate's total training in nuclear cardiology. All components of Level 2 training in nuclear cardiology, including the 80 hours of Classroom and Laboratory Training (CLT), must be completed prior to applying to sit for the exam. The preceptor letter must document the dates of the applicant's training, be written on organizational letterhead and dated no earlier than 36 months prior to application.

Important Notice: Beginning in 2011 all preceptors must have a [Program Verification](#) on file with CBNC before a preceptor attestation letter can be accepted. Check with your preceptor prior to sending your documents as your application cannot be approved without this document on file. [Preceptor Information and Guidance](#)

A preceptor for this pathway must be one of the following:

- Program Director of an accredited residency or fellowship in Cardiovascular Disease, Nuclear Medicine, or Radiology

- Director of Nuclear Cardiology laboratory at an institution with an accredited residency or fellowship in Cardiovascular Disease, Nuclear Medicine, or Radiology.
- If the preceptor is not an authorized user, an authorized user at the training institution must co-sign the letter to verify that the candidate has had appropriate training in radiation safety.

Recentness of Training

If nuclear cardiology training was completed seven (7) or more years prior to the date of the CBNC exam for which you are applying, you must provide:

- documentation of at least [300 cases](#) within the last 24 months at time of application.
- 25 CME Category I hours in nuclear cardiology taken within the last 36 months at time of application. See Guidance on [CME Credit](#)

"Experience" Pathway Candidates [no new candidates accepted]

Candidates who did not receive nuclear cardiology training within the context of an accredited fellowship or residency program **and** who have sat previously for the CBNC exam must provide:

- Documentation of Authorized User status (e.g., by copy of current facility radioactive materials license listing the applicant's name) or Authorized User eligibility (e.g., by certificate of completion of a course with a minimum of 80 hours which included all topic areas required by the Nuclear Regulatory Commission, taken no more than 7 years prior to the date of the exam for which you are applying).
- [A preceptor attestation letter](#). The preceptor must be certified by one of the following Boards: CBNC, ABNM, ABR, AOBNM or AOBR. ABIM certification alone does not qualify. If the preceptor is not an Authorized User, an Authorized User must co-sign to verify that the candidate has had appropriate training in radiation safety. The preceptor letter must be dated no earlier than 36 months prior to application and must document the training dates of the applicant. The preceptor verifying training/experience for this pathway must include in the preceptor letter his or her NRC or Agreement State License Number.
- Ongoing experience as evidenced by interpretation of a minimum of 300 cases (current Nuclear Cardiology COCATS requirement for Level 2) in the preceding 24 months of application; See [Letter Templates](#) and
- At least [25 hours of CME](#) specific to nuclear cardiology within the preceding 36 months of application.

Special NOTE: All U.S. applicants must submit evidence of either Authorized User status, (e.g., a copy of the facility's radioactive materials license listing the candidate's name), OR of Authorized User eligibility, (e.g., a certificate of completion of a radioisotope handling and radiation safety course with a minimum of 80 hours which included all topic areas required by the Nuclear Regulatory Commission and dated no more than 7 years prior to the date of the exam for which you are applying.)

If the Classroom and Laboratory Training hours were an integral part of the fellowship program, the candidate's preceptor should include the following text in his/her preceptor attestation:

Dr. _____ completed a minimum of 80 hours of Radioisotope Handling Classroom and Laboratory Training which meets the requirements of the Nuclear Regulatory Commission within his/her fellowship program.

Training and experience requirements for licensure by the Nuclear Regulatory Commission (NRC) or Agreement States vary from state to state; therefore, candidates seeking licensure should check with their regional NRC office or the office responsible for licensure in the Agreement State in which they practice. Information is also available on the NRC website: nrc-stp.ornl.gov/.

Requirement 2: Licensure

To be certified, applicants must hold a current, unconditional, unrestricted license to practice medicine in the U.S. and must provide a copy of the current license.

- Individuals with limited or training medical licenses may apply to sit for the examination. Certification will only be granted, however, when all requirements are met within 6 years of the examination, including holding a current unrestricted medical license. Such candidates who pass the examination will be listed as "testamurs" until all requirements for certification are fulfilled. Individuals in this situation should call for direction on documentation to be submitted.

Requirement 3: Board Certification

To be certified, applicants must be physicians who are Board Certified in Cardiology, Nuclear Medicine or Radiology by a board which holds membership in either the American Board of Medical Specialties or the Bureau of Osteopathic Specialists of the American Osteopathic Association and must provide a copy of the current board certification.

- Individuals enrolled in an ACGME or AOA fellowship or residency program in Cardiology, Nuclear Medicine, or Radiology may apply to sit for the examination. Certification will only be granted, however, when all requirements are met within 6 years of the examination, including board certification in Cardiology, Nuclear Medicine, or Radiology. Such candidates who pass the examination will be listed as "testamurs" until all requirements for certification are fulfilled.

Special Note Regarding Testamur Status: As noted above, individuals who pass the CBNC exam under Testamur status have 6 years from passing the CBNC to document full licensure and successful certification in Cardiology, Nuclear Medicine or Radiology in order to have their Testamur status changed to Diplomate. This certification will expire 10 years from the date of passing the CBNC examination.

Special Note:

- Beginning in 2011 all preceptors who write attestation letters for individuals who completed Level 2 in a training program must have a [Program Verification](#) form on file with the CBNC office before their

Preceptor Attestation Letter can be accepted. Guidance and information for preceptors can be found on this [page](#) of the CBNC website.

- CBNC is not accepting NEW applicants whose Level 2 equivalent was completed by experience.
- Preceptor attestation letters and other supporting documentation must accompany application. Preceptor templates may be found and completed on this [link](#) of the CBNC website. Preceptors are STRONGLY encouraged to use these to ensure that the language in their letters complies with CBNC requirements.
- Preceptor letters must be dated no earlier than 36 months prior to application.
- Preceptor letters must be on organizational letterhead and the author's relationship to the applicant provided (e.g., Program Director).
- The letter must include the applicant's nuclear cardiology training dates.
- If the preceptor is not an Authorized User, an Authorized User at the training institution must co-sign the letter to verify that the candidate has had appropriate training in radiation safety.

Appendix B

COCATS Guidelines for Level 2 Training in Nuclear Cardiology

COCATS Guidelines (Revised 2008)

American College of Cardiology Foundation/American Society of Nuclear Cardiology COCATS Guidelines for Training in Nuclear Cardiology

Overview of Nuclear Cardiology Training

Training in nuclear cardiology at all levels should provide an understanding of the indications for specific nuclear cardiology tests, the safe use of radionuclides, basics of instrumentation and image processing, methods of quality control, image interpretation, integration of risk factors, clinical symptoms and stress testing and the appropriate application of the resultant diagnostic information for clinical management. Training in nuclear cardiology is best acquired in Accreditation Council for Graduate Medical Education (ACGME) approved training programs in cardiology, nuclear medicine or radiology. An exception to this ACGME requirement is the didactic and laboratory training in radiation safety and radioisotope handling that may be provided by qualified physicians/scientists in a non-ACGME program when such a program is not available as part of the clinical ACGME training program. For laboratories that provide training to cardiology fellows, accreditation by the Intersocietal Commission for the Accreditation of Nuclear Laboratories (ICANL) is also recommended.

Didactic, clinical case experience and hands-on training hours require documentation in a logbook¹ and having the trainee's name appear on the clinical report or having some other specific record. The hours need to be monitored and verified by the nuclear cardiology training preceptor.

Specialized Training - Level 2 (Minimum of 4 Months)

Fellows who wish to practice the specialty of nuclear cardiology are required to have at least 4 months of training. This includes a minimum of 700 hours of radiation safety training in nuclear cardiology. There needs to be didactic, clinical study interpretation, and hands-on involvement in clinical cases. In training programs with a high volume of procedures, clinical experience may be acquired in as short a period as 4 months. In programs with a lower volume of procedures, a total of 6 months of clinical experience will be necessary to achieve Level 2 competency.

The COCATS Guidelines were revised in 2008. Preceptor Attestations referencing this document are required for certification exam applicants.

The additional training required of Level 2 trainees is to enhance clinical skills, knowledge, and hands-on experience in radiation safety and to qualify them to become authorized users of radioactive materials in accordance with the regulations of the Nuclear Regulatory Commission (NRC) and/or the Agreement States.

Didactic Program

Lectures and self-study. The didactic training should include in-depth details of all aspects of the procedures listed in Table 1 (see below). This program may be scheduled over a 12- to 24-month period concurrent and integrated with other fellowship assignments.

Radiation Safety. Classroom and laboratory training needs to include extensive review of radiation physics and instrumentation, radiation protection, mathematics pertaining to the use and measurement of radioactivity, chemistry of byproduct material for medical use, radiation biology, the effects of ionizing radiation and radiopharmaceuticals. There should be a thorough review of regulations dealing with radiation safety for the use of radiopharmaceuticals and ionizing radiation. This experience should total a minimum of 80 hours and be clearly documented.

Interpretation of Clinical Cases

Fellows should participate in the interpretation of all nuclear cardiology imaging data for the 4-6 month training period. It is imperative that the fellows have experience in correlating catheterization or CT angiographic data with radionuclide-derived data in a minimum of 30 patients. A teaching conference in which the fellow presents the clinical material and nuclear cardiology results is an appropriate forum for such an experience. A total of 300 cases should be interpreted under preceptor supervision, from direct patient studies.

Hands-on Experience

Clinical cases. Fellows acquiring Level 2 training should have hands-on supervised experience in a minimum of 35 patients: 25 patients with myocardial perfusion imaging and 10 patients with radionuclide angiography. Such experience should include pretest patient evaluation, radiopharmaceutical preparation (including experience with relevant radionuclide generators and CT systems), performance of studies with and without attenuation correction, administration of the dosage, calibration and setup of the gamma camera and CT system, setup of the imaging computer, processing the data for display, interpretation of the studies and generating clinical reports.

Radiation safety work experience. This experience should total 620 hours and be acquired continuously during training in the clinical environment where radioactive materials are being used and under the supervision of an authorized user who meets the NRC requirements of Part 35.290 or Part 35.290(c)(ii)(G) and 35.390 or the equivalent Agreement State requirements, and must include:

- a) Ordering, receiving and unpacking radioactive materials safely and performing the related radiation surveys;
- b) Performing quality control procedures on instruments used to determine the activity of dosages and performing checks for proper operation of survey meters;
- c) Calculating, measuring and safely preparing patient or human research subject dosages;
- d) Using administrative controls to prevent a medical event involving the use of unsealed byproduct material;
- e) Using procedures to safely contain spilled radioactive material and using proper decontamination procedures;
- f) Administering dosages of radioactive material to patients or human research subjects; and

g) Eluting generator systems appropriate for preparation of radioactive drugs for imaging and localization studies, measuring and testing the eluate for radionuclide purity, and processing the eluate with reagent kits to prepare labeled radioactive drugs.

Additional experience

The training program for Level 2 training must also provide experience in computer methods for analysis. This should include perfusion and functional data derived from thallium or technetium agents and ejection fraction and regional wall motion measurements from radionuclide angiographic studies.

¹ Note: These logbooks are not to be submitted with the CBNC application.

Table 1 Classification of Nuclear Cardiology Procedures

1) Standard nuclear cardiology procedures

- a) Myocardial perfusion imaging
 - i) SPECT with technetium-99m agents and/or thallium-201, with or without attenuation correction
 - ii) PET with rubidium-82 and/or nitrogen-13 ammonia
 - iii) Planar with technetium-99m agents and/or thallium-201
 - iv) ECG gating of perfusion images for assessment of global and regional ventricular function
 - v) Imaging protocols
 - vi) Stress protocols
 - 1) Exercise stress
 - 2) Pharmacologic stress
 - vi) Viability assessment including reinjection and delayed imaging of thallium-201 and/or metabolic imaging where available
- b) Equilibrium radionuclide angiography and/or "first-pass" radionuclide angiography at rest
- c) Qualitative and quantitative methods of image display and analysis

2) Less commonly used nuclear cardiology procedures

- a) Combined myocardial perfusion imaging with cardiac CT for attenuation correction or anatomic localization
- b) Equilibrium radionuclide angiography and/or "first-pass" radionuclide angiography during exercise or pharmacologic stress
- c) Metabolic imaging using single photon and/or positron emitting radionuclides
- d) Myocardial infarct imaging
- e) Cardiac shunt studies

To receive a copy of the complete COCATS Guidelines for Training in Nuclear Cardiology, visit the American Society of Nuclear Cardiology Website: www.asnc.org.

NUCLEAR CARDIOLOGY ROTATION
FELLOW RESPONSIBILITIES BY MONTH OF TRAINING

1st Month in Nuclear Medicine

Instrumentation (Image Acquisition/Processing)

Days 1 & 2: Rest MUGA: observe; process; interpret
Stress MUGA: observe, process, interpret
Quality Assurance

DAYS 3 & 4: REST MPI: OBSERVE, PROCESS, INTERPRET

Stress MPI (physical): observe, process, interpret
Stress MPI (Persantine): observe, process, interpret
Stress MPI (Dobutamine): observe, process, interpret

Week One Day 5: Float day (process/acquisition)
Study interpretations
Radiation Safety (One-hour with Dr. Janice Campbell ask Jeannine to schedule time for you)

Days 1-5: Read **Essentials of Nuclear Medicine**
Chapters 2 & 3: Instrumentation; Quality Control
Review Teaching CD's (at least 1)

Days 1-3: Radiopharmacy

Days 4-5: Processing

Week Two Days 1-5: Study interpretation (minimum 5 cases/day)
Read **Clinical Nuclear Cardiology, State of the Art...**
Section 1 Radiopharmaceuticals/Tracer Kinetics, Chapters 1-3
Review Teaching CD's (at least 1)

Week Three Days 1-5: Study interpretation (minimum 5 cases/day)
Read **Clinical Nuclear Cardiology, State of the Art...**:
-Section III Ventricular Function, Chapters 11-12
Read **Nuclear Medicine Self-Study III – Cardiology Series 1-8**
Review Teaching CD's (at least 1)
Present correlative conference to nuclear medicine residents The cases should include all imaging modalities utilized in the workup of the patient, e.g., MPI, cath, MRI, echo, CTA

Day 1: PET MPI: observe; process; interpret

Week Four Days 2-4: Scan interpretation (minimum 5/day)

Day 5: Read **Clinical Nuclear Cardiology, State of the Art...**
Section VII Viability, Chapters 31-34

NUCLEAR CARDIOLOGY ROTATION
FELLOW RESPONSIBILITIES BY MONTH OF TRAINING

2nd Month in Nuclear Medicine

Revisit Image Acquisition/Processing

Week One	Days 1 & 2:	Rest MUGA: observe; process; interpret Stress MUGA: observe, process, interpret Rest/Stress MPI: observe, process, interpret Rest/Stress PET MPI: observe, process, interpret
	Days 3 & 4:	Quality Control (6:30 AM with QC/QA Coordinator – (schedule with Stu Dees ext. 84685) Observe in Radiopharmacy - prep & dispensation of product (schedule with Michele or Nichole in radiopharmacy)
	Day 5:	Study interpretations
Week Two	Days 1-5:	Study interpretations Read Nuclear Cardiac Imaging, Principles and Applications (any chapters of interest)
Week Three	Days 1-5:	Study interpretations Read Clinical Nuclear Cardiology, State of the Art... Section IV Perfusion Imaging, Chapters 13-14 Present correlative conference to nuclear medicine residents The cases should include all imaging modalities utilized in the workup of the patient, e.g., MPI, cath, MRI, echo, CTA
Week Four	Days 1-5:	Revisit PET MPI: process and perform study interpretations (Cardiac PETs) Read Clinical Nuclear Cardiology, State of the Art... Section IV Perfusion Imaging, Chapters 15-16 Read Atlas of Nuclear Cardiology, Chapter 7 The Role of Myocardial Perfusion Imaging in Special Populations

NUCLEAR CARDIOLOGY ROTATION
FELLOW RESPONSIBILITIES BY MONTH OF TRAINING

3rd Month in Nuclear Medicine

Review/Revisit Basic Instrumentation

Week One	<p>Days 1-5: Review/revisit basic instrumentation, principles, production of radiopharmaceuticals, and imaging procedures</p> <p style="padding-left: 20px;">Study interpretations: Rest/Stress MUGA SPECT/PET MPI</p>
<hr/>	
Week Two	<p>Days 1-5: Study interpretations</p> <p style="padding-left: 20px;">Review ACC/AHA/ASNC Guidelines for the Clinical use of Cardiac Radionuclide Imaging in: <i>Circulation</i> 2003;108;1404-1418</p> <ul style="list-style-type: none"> - Acute Syndromes - Chronic Syndromes - Management of Patients with Known or Suspected CAD - Recommendations: Cardiac Stress MPI
<hr/>	
Week Three	<p>Days 1-5: Study interpretations</p> <p style="padding-left: 20px;">Review ACC/AHA/ASNC Guidelines for the Clinical use of Cardiac Radionuclide Imaging in: <i>Circulation</i> 2003;108;1404-1418</p> <ul style="list-style-type: none"> - Heart Failure - Myocardial Viability - Appendix - Procedures & Principles <p style="padding-left: 20px;">Present correlative conference to nuclear medicine residents The cases should include all imaging modalities utilized in the workup of the patient, e.g., MPI, cath, MRI, echo, CTA</p>
<hr/>	
Week Four	<p>Days 1-5: Study interpretations</p> <p style="padding-left: 20px;">Revisit/review: PET MPI (Instrumentation, radiopharmaceuticals, acquisition, processing, and patient prep)</p>
<hr/>	

NUCLEAR CARDIOLOGY ROTATION
FELLOW RESPONSIBILITIES BY MONTH OF TRAINING

4th Month in Nuclear Medicine
Review/Revisit

Week One

Days 1-5: Revisit/review principles of MPI and radionuclide ventriculography (MUGA), radiopharmaceuticals, and imaging procedures
Study interpretations:
Rest/Stress SPECT/PET MPI
Rest/Stress MUGA

Week Two

Days 1-5: Revisit/review myocardial perfusion and radionuclide ventriculography processing and interpretation (sources of F(+) and F(-) studies and artifacts)
Study interpretations:
Rest/Stress SPECT/PET MPI
PET Viability
Rest/Stress MUGA

Week Three

Days 1-5: Review exercise/pharmacologic stress protocols, clinical applications in J Nucl Card 2010; 17(3);1071-3581.
Study interpretations:
Rest/Stress MUGA
SPECT/PET MPI
Present correlative conference to nuclear medicine residents The cases should include all imaging modalities utilized in the workup of the patient, e.g., MPI, cath, MRI, echo, CTA

Week Four

Days 1-5: Read: **Nuclear Cardiology: The Basics - How to Set-Up and Maintain a Laboratory**
Study interpretations
Rest/Stress PET MPI
Rest/Stress SPECT MPI
PET Viability

CARDIAC CATHETERIZATION LABORATORY

Director: George Hanzel, MD

Teaching Faculty: S. Ajluni MD, S. Almany MD, A. Berman MD, T. Bowers MD, W. Devlin MD, A. Halabi MD, S. Dixon MD, R. Safian MD, M. Shoukfeh MD, H. Friedman MD, P. Kraft MD, J. Trivax MD, A. Abbas MD, S. Timmis MD, Maher Rabah DO

A. OBJECTIVES

The objectives of the Cardiac Cath Lab Teaching Program are to provide an educational environment in which the Cardiology Fellows will learn:

1. Patient selection, including risk and benefits.
2. Selection of vascular access, catheters, and radiographic contrast.
3. Cardiac catheterization techniques.
4. Acquisition and interpretation of angiographic images.
5. Recognition of artifacts in angiographic and hemodynamic data.
6. Acquisition and interpretation of hemodynamic data.
7. Avoidance, recognition and management of complications.
8. Formulation of appropriate treatment after cardiac catheterization.
9. Dictation of reports, which address all pertinent considerations.
10. Develop a thorough understanding of radiation safety.

B. TEACHING STRATEGIES

1. The Cardiac Catheterization Laboratory (CCL) teaching service consists of several teaching attendings, at least one clinical cardiology fellow, and at least two interventional cardiology fellows.
2. On the CCL teaching service, one fellow is usually “scrubbed” with the teaching attending, so the “hands-on” aspect of the educational experience involves a direct one-on-one arrangement between the fellow and attending. This arrangement permits close interaction with the fellows and attending staff, and offers superb fellow experience and close attending supervision. As fellows demonstrate increasing competence with increasing experience, they will have more independence (see the description of fellow responsibilities by year of training in Section D below).
3. Although most of the technical aspects of cardiac catheterization are learned best in the CCL, most of the cognitive training take place in several venues:
 - a. Weekly interdisciplinary cardiac cath conference
 - b. Weekly cath and hemodynamic conference with Dr. Ramos
 - c. Daily noon conference
 - d. Journal club
 - e. Self learning by study of ACC/AHA guidelines for cardiac catheterization, percutaneous revascularization, and cardiac surgery
 - f. Self learning by study of the ACC Cath SAP

C. ATTENDING RESPONSIBILITIES

1. Teach the fellows the indications for procedures; selection of equipment and angiographic views; review findings; and discuss complications and patient follow-up.
2. Discuss cost effectiveness of various interventional strategies, quality assurance issues, safety, and effective documentation for medicolegal purposes.

3. Dr. Ramos supervises a conference for reviewing angiographic and hemodynamic data on Mondays 4:30 – 5:30 PM.
4. An attending physician is required to be immediately available during all diagnostic procedures; fellows will participate in the following teaching faculty cases:
 - a. left heart catheterization
 - b. selective coronary angiography
 - c. intracoronary thrombolytic therapy
 - d. intraaortic balloon pump counterpulsation
 - e. brachial arteriotomy/venotomy repair
 - f. ventriculography, aortography, pulmonary angiography
 - g. temporary pacemaker insertion
 - h. right heart catheterization
 - i. pericardiocentesis
5. The Cath Lab Director (or surrogate) will meet with the Cath fellow(s) at the beginning of the monthly rotation to verbally review the goals, objectives, and responsibilities for the upcoming month. The Fellowship Coordinator will maintain a signature log confirming that this meeting has occurred.
6. The Cath Lab Director (or surrogate) will meet with the Cath fellow(s) at the end of the monthly rotation to verbally review the fellow's written evaluation and performance. The attending will complete a formal evaluation of fellows' performance using E*Value. The Fellowship Coordinator will maintain a signature log confirming that this meeting has occurred.

D. FELLOW RESPONSIBILITIES

RESPONSIBILITIES BY YEAR OF TRAINING

1. 1st Year Fellow
 1. Catheterization techniques: acquire technical proficiency and an understanding of the anatomy for:
 - a. Arterial and central venous access
 - b. Left ventriculography and aortography
 - c. Coronary and bypass graft arteriography
 2. Hemodynamics: demonstrate skill in obtaining, analyzing, and interpreting pressure tracings in the evaluation of:
 - a. Normal heart
 - b. Acute and chronic ischemic heart disease
 - c. Myocardial diseases including inflammatory, hypertrophic, infiltrative, idiopathic, dilated, and restrictive patterns
 - d. Pericardial constriction and tamponade
 - e. Valvular heart disease
 - f. Intracardiac shunts (adult congenital and acquired)
 - g. Learn to recognize sources of error and artifact, and how to correct them.
 3. Demonstrate skill and cognitive understanding of:
 - a. Sheath removal, principles of hemostasis, and potential complications
 - b. Indications and contraindications for vascular closure devices
 - c. Placement and removal of IABP
 - d. The diagnosis and management of hypotension, bleeding, vascular injury, allergy to contrast and latex, contrast nephropathy, and cholesterol embolization
 - e. Indications and techniques of temporary pacemaker insertion.
 4. Other Cognitive Skills

- a. Demonstrate understanding of medicolegal issues and proper documentation as they pertain to cardiac catheterization
 - b. Demonstrate timely and accurate report dictation
 - c. Demonstrate understanding of radiation safety
2. 2nd Year Fellow
- 1. Continued demonstration of all first-year skills with demonstration of greater independent performance.
 - 2. Plan entire procedure with attending supervision.
 - 3. Proper selection of catheters and radiographic contrast.
3. 3rd Year Fellow
- 1. Continued demonstration of all first and second-year skills, plus:
 - a. place and set up IABP with attending supervision
 - b. be capable of performing all aspects of diagnostic cardiac catheterization independently, including selection of catheters and angiographic views

PATIENT CARE

- 1. The fellow should meet the patient in the holding area, and review the history & physical, consent, allergies, and laboratory values.
- 2. If the fellow did not work-up the patient, the work-up in the chart should be reviewed. The fellow should meet the patient in advance, and review any prior angiogram.
- 3. Arterial access by first year fellows must be supervised by an attending physician. Femoral vein access may be obtained by fellows after the first month of the Cath Lab rotation if the attending is present on the Heart and Vascular unit.
- 4. First and second year fellows may perform coronary angiography only under the direct and immediate supervision of the attending physician. A third year fellow may perform coronary angiography only if the attending physician is present in the Cardiac Catheterization room. Generally, 4-5 cases will be performed per day with a maximum of 8 cases.
- 5. The Fellow is responsible for writing all post-catheterization and PCI orders. If the patient is going to the Coronary Care Unit, the fellow must notify the CCU resident, who will come to the Cath Lab and write the orders.
- 6. Complications after diagnostic catheterization should be managed by the fellow who did the procedure, under attending supervision. Complications that occur after PCI should be managed by the Interventional fellow who did the procedure. If the fellows who did the procedure are not in the hospital, the interventional fellow on-call should manage the problem.
- 7. During the first month in the cath lab, the 1st year fellow will remove sheaths from the first three cases they perform every day, to obtain experience at removing vascular sheaths. These should be done in the holding room using manual pressure.
- 8. A procedure note must be written in the chart for removal of all sheaths. The following information is mandatory:
 - a. ACT and CBC prior to sheath removal
 - b. Documentation of a hematoma prior to removal
 - c. The duration and technique of compression
 - d. The presence of a hematoma after compression
 - e. The occurrence and treatment of any/all complications
 - f. The status of pulses before and after sheath removal
- 9. Certified staff from the cath lab or the Cardiology units (CCU, CPCU, CIU) may remove arterial and/or venous catheters and sheaths, except as noted below:

<u>Catheter/Sheath Type</u>	<u>Guidelines</u>
Venous sheaths (all sizes) and arterial Sheaths <10 Fr	None
Arterial Sheaths ≥ 10 Fr	Must be removed by attending cardiologist or fellow
Femoral graft access	Must be removed by attending cardiologist or fellow (manual hold only)
New iliac stent (same side, less than 6 months old)	Must be removed by attending cardiologist or fellow (manual hold only)
New iliac stent (opposite side approach)	None
Old iliac stent site (more than 6 months old)	Manual hold only
Cardiac biopsy sheath	Must be removed by attending cardiologist or fellow
Brachial lines	Must be removed by attending cardiologist or fellow
Radial lines	Must be removed by attending cardiologist or fellow
Markedly obese	May require assistance from attending cardiologist or fellow
Aortic insufficiency	None
SBP > 180mmHg	None
IABP	Must be removed by attending cardiologist or fellow

10. Responsibility for sheath removal in the stepdown units is assigned as follows (if sheaths are not removed by the nursing staff):
 - a. If an interventional fellow performed the procedure, the sheath will be removed by the interventional fellow on-call.
 - b. If the procedure was performed by a clinical fellow the sheath will be removed by the CCU fellow on-call.
 - c. Fellows are not expected to remove sheaths for non-teaching attendings unless a fellow participated in the procedure (e.g. acute MI) or unless a patient needs immediate attention. The attending cardiologist is responsible for these cases.

- d. The attending cardiologist has ultimate responsibility for the care of the patient; if the fellow encounters difficulty during the sheath removal, the attending cardiologist must personally evaluate the situation.
11. Review the hemodynamic and angiographic data and dictate the report immediately following the procedure.
12. Clinical fellows should be in the Cath Lab from 7:00 AM to 7:00 PM daily, or until the cases for that teaching attending are completed (up to a maximum of 8 cases per day).
13. Interventional Fellow Weeknight Call Responsibilities
 - a. Interventional fellow on long call is responsible for the lab until the last case is done.
 - b. After 10:00 PM the interventional fellow is responsible for all emergency interventions regardless of attending until 7:00 AM the next morning. Friday night coverage extends till 8:00 AM Saturday morning.
 - c. Until the clinical fellows are trained/certified to perform invasive CCU procedures, the on-call interventional fellow should serve as a resource for emergency procedures in the CCU.
14. Interventional Fellows Weekend Responsibilities
 - a. Call begins at 8:00 am Saturday and ends 7:00 am Monday.
 - b. Interventional procedures include all acute MI research cases; any complex interventional case in which the Attending physician needs assistance that cannot be given by the clinical fellow; and situations in which 2 acute interventions are being performed at the same time.

MEDICAL KNOWLEDGE

1. Fellows are expected to understand basic principles of cardiac catheterization. An excellent resource for the purpose is the Textbook of Cardiac Catheterization and Intervention, by Dr's. Baim and Grossman.
2. Fellows must understand fundamental hemodynamic principles of pressure measurement, valve area calculations, cardiac output, vascular resistance measurements, and intra- and extra-cardiac shunt evaluations.
3. Basic principles of angiography must be mastered, including techniques for arterial and venous access, sheath insertion, catheter selection and manipulation, and angiographic views.
4. Fellows must acquire a basic understanding of x-ray exposure, imaging chain, and operation of the x-ray equipment. They must understand the risks of ionizing radiation, and how to protect themselves, the patient, and the CCL staff from radiation exposure.
5. It is essential that fellows acquire a thorough understanding of the indications, contraindications, benefits, risks, and alternatives of cardiac catheterization. An excellent resource is the ACC/AHA guidelines.
6. Fellows who participate in the CCL must be aware of the important major and minor complications associated with cardiac catheterization. These are discussed routinely during weekly conferences, and monthly M&M conference, and should be discussed with the CCL teaching attending when such events occur. Fellows are expected to master an understanding of the diagnosis, evaluation, treatment, and prevention of the following complications: local and systemic complications, including vascular injury; embolism; bleeding; fever; and reactions to radiographic contrast.
7. Understand and implement the principles of conscious sedation, particularly as they apply to patients in the CCL.
8. Understand the importance of, and need for, proper informed consent.

PRACTICE-BASED LEARNING

1. All patients should be screened by the fellow to determine eligibility for research studies.
2. Identify patients and prepare presentations for Tuesday Cath Conferences. All fellows (1st, 2nd, and 3rd year) should share this responsibility, even if the cath lab rotation is an elective.
3. Fellows in the cath lab are responsible for preparing presentations for the following conferences:
 - a. Cine and Hemodynamics Conference (Monday 4:00 pm): This is required for all 1st and 2nd year fellows. Angiographic and hemodynamic data should be reviewed with the attending physician. The fellow should present the history, physical findings, test results, and management.
 - b. Combined Cath/Cardiac Surgery Conference (Tuesday 7:30 am): All fellows in the cath lab rotation (1st, 2nd, 3rd year) are responsible for identifying one case per fellow per week, reviewing the history, invasive and noninvasive data, and reviewing the literature.
4. Participate in all mandatory cardiology conferences.

INTERPERSONAL & COMMUNICATION SKILLS

1. The senior clinical fellow should assign fellows to each lab at 6:45 am daily.
2. Provide a complete explanation to the patient about the risks, benefits, and alternatives to cardiac catheterization, as appropriate. Be available to offer additional explanations and insight if informed consent has already been obtained.
3. Communicate with the patient and family to alleviate anxiety and fear, and explain what measures will be utilized to alleviate pain, discomfort, and anxiety.
4. Communicate with the attending about excessive patient concerns, unforeseen complications, or anything out of the ordinary.
5. Communicate with CCL holding room nurses, since they are most familiar with the patient's progress, before and after cardiac catheterization.

SYSTEMS-BASED PRACTICE

1. Read, understand, and implement ACC/AHA guidelines for cardiac catheterization, PCI, and CABG.
2. Utilize various written and web-based resources to enhance self-study of cardiac catheterization, including:
 - a. Textbook of Cardiac Catheterization, and Intervention (Baim & Grossman): basic principles of hemodynamics and angiography
 - b. Manual of Interventional Cardiology (Safian & Freed): catheter selection, angiography and angiographic views, x-ray equipment, radiation exposure, complications
 - c. ACC Cath SAP (CD-ROM): evidence-based approaches; all aspects of cardiac catheterization

PROFESSIONALISM

1. Clinical fellows should be in the Cath Lab from 7:00 AM to 5:00 PM daily, or until the cases for that teaching attending are completed (up to a maximum of 8 cases per day).
2. Always maintain a positive and professional attitude towards the patient.
3. Maintain professional interactions with the nursing staff, technical staff, and physicians.
4. Do your best to alleviate patient fear, anxiety, and discomfort by thoughtful communication and use of appropriate conscious sedation.

E. EVALUATIONS

1. Each fellow will be evaluated on a monthly basis at the end of the Cath Lab rotation, as follows (360° Evaluation):

- a. A formal evaluation will be completed by the Cath Lab attending(s) using New Innovations, and the content of the evaluation will be reviewed verbally with the fellow. Deficiencies must be forwarded to the Program Director. Monthly evaluations will also be completed by the Chief Fellow, the Chief Interventional Fellow, and the Nursing manager of the CCL. The fellow will also evaluate his/her performance in the context of the goals and responsibilities for this rotation.
 - b. Cath Lab Director must sign the procedure credentialing log at the end of the month, and a copy of the form must be filed with the Fellowship Coordinator.
2. The Cath Lab fellow(s) will complete a formal evaluation of the Cath Lab attending(s) each month using New Innovations. This evaluation will be reviewed on an annual basis with the Program Director and Chief of Cardiology.

F. CREDENTIALING

1. Diagnostic Cardiac Catheterization (left heart catheterization, selective coronary angiography, intra-aortic balloon pump counterpulsation):
 - a. Completion of 3-year Cardiology Fellowship Program.
 - b. Minimum of 6 months Cath Lab training.
 - c. Certification of training and competency by Program Director and Cath Lab Director.
 - d. Performance of at least 400 procedures in training (Level II Certification).
2. Right Heart Catheterization: Document 10 supervised cases.

CONTINUITY (OUTPATIENT) CLINIC

Teaching Faculty: Kavitha Chinnaiyan MD, Simon Dixon MBChB, James Goldstein MD, David Haines MD, George Hanzel MD, Robert Safian MD, Ivan Hanson MD, A. Neil Bilolikar MD

A. OBJECTIVES

1. To develop skills for outpatient management of patients with cardiovascular diseases.
2. To acquire skills in physical examination pertaining to the heart, lung, brain and vascular systems.
3. To develop skills for ECG interpretation relevant to the outpatient setting.
4. To become expert in the assessment and treatment of risk factors for ischemic heart disease (smoking cessation, hypertension, hyperlipidemia, obesity, diabetes).
5. To perform a thorough cardiovascular assessment as part of preoperative cardiac clearance.
6. To recognize the need for non-cardiac consultations to manage cardiac patients with non-cardiac problems.
7. To understand the indications for non-invasive cardiac imaging modalities (echo, duplex, MR, CT, nuclear, Holter, tilt-table, etc).
8. To develop skills for record keeping, billing, and dictation.

B. TEACHING STRATEGIES

1. The Outpatient Clinic rotation consists of one cardiology attending and 1-2 cardiology fellows per half-day session.
2. The teaching strategy relies on a one-to-one interaction between the fellow and the attending in the setting of a busy clinical cardiovascular practice.
3. The teaching model involves the fellow performing a detailed history and physical examination; cogent presentation of the findings to the attending; review of pertinent noninvasive and invasive data; and a joint visit with the patient to review pertinent historical or physical findings, and to make further recommendations for evaluation and treatment.
4. In addition to the oral presentation described above, the fellow will dictate a focused letter to the referring doctor, detailing the information and recommendations above. The letter gives the fellow an opportunity to synthesize all available information, and to design a treatment plan for each patient. Each dictation is reviewed and corrected by the attending, reviewed by the fellow, and then mailed to the referring doctor.
5. The scope of the outpatient curriculum is similar to that of the inpatient service, although the acuity of the patients is less. See pages 64-65 for more details.

C. ATTENDING RESPONSIBILITIES

4. Supervise the fellow's interaction with the patients.
5. See all patients, and review pertinent physical and ECG findings when appropriate.
6. Teach fundamentals of ECG interpretation as they pertain to an outpatient setting.
7. Provide instruction in the indications for and interpretation of non-invasive and invasive tests.
8. Review and correct fellow dictations, providing appropriate feedback.
9. Help and supervise in the treatment of risk factors, and ensure appropriate monitoring.

D. FELLOW RESPONSIBILITIES

PATIENT CARE

1. Perform a complete but focused cardiovascular history and physical examination for all new patients and followups.
2. Present all patients to the Attending, focusing on the cardiovascular aspects and pertinent non-cardiac medical problems.
3. See 3-5 new patients and 5-10 return patients per half-day of continuity clinic.
4. Read and interpret ECGs for their patients.
5. Assist nursing staff in responding to questions from patients and families.
6. Recognize the need to address psychosocial and financial issues, and enlist the support of appropriate hospital resources.
7. Obtain consultations from other medical and surgical services when indicated.

MEDICAL KNOWLEDGE

1. The knowledge base for management of the Outpatient Clinic is huge. The fellow is expected to demonstrate understanding of the pathophysiologic bases for diseases including:
 - a. acute coronary syndromes
 - b. acute myocardial infarction
 - c. chronic ischemic heart failure
 - d. acute and chronic heart failure
 - e. atrial and ventricular tachyarrhythmias
 - f. cardiogenic shock
2. In addition, fellows are expected to master the approach to the diseases listed above with respect to:
 - a. pharmacologic treatment
 - b. noninvasive education (ECG, echo, nuclear, CT, MR, etc)
 - c. invasive EP evaluation and device treatment
 - d. cardiac catheterization, angiography, and intervention
 - e. cardiovascular surgery, including CABG, valve replacement, valve repair, and surgical approaches to arrhythmia
3. Fellows must master the principles of:
 - a. risk assessment and risk factor modification
 - b. cardiovascular pharmacology
4. Fellows should acquire and begin to develop the knowledge base for other sophisticated cardiac and vascular disease, including:
 - a. peripheral arterial disease
 - b. stroke
 - c. pericardial disease
 - d. acute and chronic aortic diseases
 - e. non-atherosclerotic cardiac and vascular diseases
 - f. complex arrhythmia diagnosis and treatment
5. Study and implement ACC/AHA guidelines as they relate to patients in the Outpatient Clinic.

PRACTICE-BASED LEARNING

1. Complete billing forms, order blood work, invasive and non-invasive tests, and dictate letters to the referring physician.
2. 1st and 2nd year fellows will follow the same patients for 2 years, 3rd year fellows can work in blocks of 6 months duration.

INTERPERSONAL & COMMUNICATION SKILLS

1. Communicate effectively with the patient and family to keep them apprised of the patient's condition and progress.
2. Interact with the paramedical support staff, nurses, nurse practitioners, and attendings to strengthen the "team" approach, and identify and resolve any problems that arise.
3. Explain indications, contraindications, risks, benefits, and alternatives for noninvasive and invasive diagnostic and therapeutic procedures.
4. Work with the office staff to ensure timely scheduling of tests, procedures, and follow-up.

SYSTEM-BASED PRACTICE

1. Fellows are expected to utilize a broad approach to expanding their educational goals, and while excellent resources are readily available among the teaching faculty, fellows are expected to review, study, master, and implement ACC/AHA guidelines in many areas, including:
 - a. acute MI, acute coronary syndromes
 - b. congestive heart failure
 - c. valvular heart disease
 - d. atrial fibrillation
 - e. cardiac catheterization and intervention
 - f. cardiac surgery
 - g. pacemakers and implantable devices
 - h. risk factor modification
2. Web-based resources provide high-quality information that is readily available on demand, and are accessible via all hospital computers and Beaumont Medical Libraries. These resources include EPOCRATES, Up-To-Date, MD Consult, and PubMed

PROFESSIONALISM

1. Always maintain a positive and professional attitude towards the patient, family, and referring physician.
2. Maintain regular and professional interaction with the nursing staff and attending physician. It is important to try to incorporate the nursing staff into important decision-making, since nurses often have the most insight into the patient's needs.
3. Special attention needs to be paid to patients and their families when dealing with end-of-life issues. It is important to ensure that patients are treated with compassion, respect, and honor, and that they and their families do not feel abandoned. Many hospital resources are available, and patients and families should be encouraged to use them.

D. EVALUATIONS

1. Each fellow will evaluate the attending on a semi-annual basis, using New Innovations.

2. The attending will evaluate the fellow on a semi-annual basis, using New Innovations. The evaluation will be reviewed with the fellow.
3. As a part of the 360° evaluation process, fellows will also be evaluated by the nursing supervisor in the Cardiology Clinic, and by individual patients and families. The fellow will also evaluate his/her performance in the context of the goals and responsibilities for this rotation.
4. Every 6 months, the attending will observe each fellow during performance of a complete history, physical examination, and assessment.

E. CREDENTIALING FOR PROCEDURES

No credentialing is necessary.

CARDIAC MRI/CT ROTATIONS

Director: Gilbert Raff MD and Kavitha Chinnaiyan MD

Teaching Faculty: Michael Gallagher MD, Jim Stewart MD, Anil Shetty PhD, A. Neil Bilolikar MD, Robert Safian MD, Elvis Cami MD

A. OBJECTIVES FOR BASIC TRAINING IN CT/MR

1. To understand the protocols and indications for cardiac CT (CCT) and cardiac MRI (CMR).
2. To understand the basic principles, applications and technical limitations of CCT and CMR.
3. To independently use the image processing software for cardiac CT to generate 3-dimensional cardiac images and identify coronary anatomy.
4. To understand contrast injection methods for CCT, adverse events and their treatment and contrast kinetics.
5. To understand the physics of image acquisition and basic sequences in CMR
6. To acquire practical experience using the 1.5-T magnet.

B. TEACHING STRATEGIES

1. The CT/MR teaching service consists of one or more CT/MR teaching attendings and one or more clinical cardiology fellows.
2. Fellows have the opportunity to learn the fundamentals of CT/MR physics and instrumentation by direct instruction with Ralph Gentry, lectures from CT/MR attendings, and by self-study of available learning materials.
3. Interpretation of CT/MR studies is of paramount importance, and is accomplished by active participation in reading sessions with the attending, and by review of the case study files.
4. Fellows acquire experience in formal report generation by completing a reading form for each case, and reviewing it with the attending.
5. Additional educational opportunities are provided by participating in the CT/MR conferences and case presentations, didactic instruction, by self-study of reading materials, and by review of cases in the teaching file.

C. ATTENDING PHYSICIAN RESPONSIBILITIES

1. The CMR/CCT attending will meet with the fellow(s) at the beginning of the monthly rotation to verbally review the goals, objectives, and responsibilities for the upcoming month. The Fellowship Coordinator will maintain a signature log confirming that this meeting has occurred.
2. The MRI/CT attending will oversee acquisition and officially read all CT and MRI studies. Attendings are required to teach fellows the principles of acquiring and reading these studies at the time of official readouts.
3. There will be regularly scheduled teaching conferences presented by fellows with attending support and participation. In addition, there will be monthly noon conferences presented by attendings and additional lectures on theory on a continual basis.
4. Attendings will provide ongoing evaluation informally to encourage fellows to perform to an expected standard. The MRI/CT Attending (or surrogate) will formally evaluate the fellow using E*Value, and meet with the MRI/CT fellow(s) at the end of the monthly rotation to verbally review the fellow's written evaluation and performance. The Fellowship Coordinator will maintain a signature log confirming that this meeting has occurred.

A. FELLOW RESPONSIBILITIES

The minimal introductory training time for CCT and CMR is one month. During this cumulative 4-week experience, fellows must be actively involved in CCT and CMR. For independent performance and interpretation of CCT and CMR, the fellow must meet the criteria listed in the ACC/AHA competency statement (Table 1).

MEDICAL KNOWLEDGE (for basic understanding of CMR/CCT during a 1 month rotation)

1. Required cognitive skills in cardiac CT include:
 - a. basic physics of CT, radiation exposure
 - b. basic scanning principles and modes for non-contrast and CE imaging
 - c. principles of safe IV contrast administration
 - d. recognition and management of contrast reactions
 - e. basic principles of image post-processing and appropriate application
 - f. clinical knowledge of cardiovascular diseases
 - g. normal coronary and cardiac anatomy
 - h. pathology of acquired and congenital heart disease
 - i. ECG artifacts and arrhythmias
 - j. Anatomy of the thoracic aorta
 - k. Acquired and congenital diseases of the thoracic aorta
2. Required cognitive skills in cardiac MR include:
 - a. image formation and various imaging sequences
 - b. physics of MR and hardware components
 - c. applications and indications
3. Certification for clinical competence in CT/MR requires mastery of the medical knowledge indicated above. For others interested in exposure (but not certified competence) in CT/MR, a fund of medical knowledge is recommended in:
 - a. basic scanning principles and modes for non-contrast and CE imaging
 - b. principles of safe IV contrast administration
 - c. recognition and management of contrast reactions
 - d. basic principles of image post-processing and appropriate application
 - e. clinical knowledge of cardiovascular diseases
 - f. normal coronary and cardiac anatomy
 - g. pathology of acquired and congenital heart disease
 - h. ECG artifacts and arrhythmias
 - i. Image formation and various imaging sequences
 - j. Applications and indications
4. Understand the indications, contraindications, risks, benefits, and alternatives for CCT/MR techniques.
5. The fellow should be present for the specified number of CCT acquisitions and be familiar with the specifics of imaging coronary arteries (ECG gating, challenges in acquisition with irregular heart rhythms, safety issues, side effects of medications, etc). The fellow should also participate in image reconstruction and calcium scoring.
6. The fellow should complete interpretation of the required number of studies, including correlation with coronary angiography. In addition, the fellow should actively participate in the interpretation of studies performed on a daily basis, including recognition of ventricular hypertrophy, dilation, valve pathologies, pericardial disease and bypass graft anatomy.

7. Fellows should be present for acquisition and post-processing of the required number of studies, to understand basic cardiac MRI sequences and applications.
8. Fellows should actively participate in daily CMR study interpretation under a qualified physician-mentor. For all studies in which other imaging modalities (echocardiography, angiography, etc) are available, such information should be correlated with CMR studies.
9. Fellows will demonstrate proficiency in identifying the following structures on CCT and CMR
 - Intracardiac structures – left ventricle (LV), right ventricle, moderator band, left atrium, left atrial appendage, right atrium, right atrial appendage, mitral valve, aortic valve, tricuspid valve, pulmonary valve.
 - Coronary arteries – left main, left anterior descending, left circumflex, right, posterior descending
 - Coronary veins
 - Coronary sinus
 - Pericardium, including pericardial recesses.
 - Pulmonary arteries – main, right, left, interlobar, segmental
 - Aorta – ascending, sinuses of Valsalva, arch, descending
 - Arteries – brachiocephalic (innominate), common carotid, subclavian, axillary, vertebral, internal mammary, intercostal
 - Veins – pulmonary, superior vena cava, inferior vena cava, brachiocephalic, subclavian, axillary, internal jugular, external jugular, azygos, hemiazygos
 - Lungs – right, left, right upper, middle and lower lobes, left upper lobe (anteroposterior, anterior and lingular segments) and left lower lobe

MEDICAL KNOWLEDGE (For advanced understanding of CMR/CCT after successful completion of the first month)

In addition to all of the knowledge-based responsibilities in the first 4-week rotation, the fellow must master the following:

1. Ischemic Heart Disease
 - a. Describe the anatomy of the coronary arteries and identify the following on a coronary angiogram, CCT and CMR:
 - Right coronary artery
 - Left main coronary artery
 - Left anterior descending artery
 - Left circumflex coronary artery
 - Obtuse marginal
 - Diagonals
 - Acute marginals
 - Septal perforators
 - b. Describe the clinical significance of coronary arterial calcification on CCT.
 - c. 3. Name the coronary artery that is usually diseased when there is papillary muscle dysfunction.
 - d. Describe the common acute complications of myocardial infarction, including left ventricular failure, myocardial rupture, papillary muscle rupture and recognize CCT/CMR findings of each.
 - e. Describe the common late complications of myocardial infarction, including ischemic cardiomyopathy, LV aneurysm, LV pseudoaneurysm, dyskinesis, akinesis, and CCT/CMR findings of each.
 - f. Identify signs of left heart failure on CCT.
 - g. Define ejection fraction, including the normal value of the LV ejection fraction.
 - h. Identify myocardial calcification on CCT and describe the etiology and significance of this finding.
 - i. Describe the difference between a LV aneurysm and pseudoaneurysm.
 - j. Define and identify myocardial bridging on CCT.

- k. Define the role of angiography, echocardiography, stress perfusion imaging, CCT and CMR in the evaluation of a patient with suspected ischemic heart disease as well as stunned myocardium and hibernating myocardium versus areas of infarction, including the advantages and limitations of each modality.
 - l. Differentiate viable from nonviable myocardium on MRI.
 - m. Identify myocardial perfusion defects on CMR.
2. Myocardial Disease
- a. Define the types of cardiomyopathy (dilated, hypertrophic, restrictive) and list the common causes of each.
 - b. Define RV dysplasia, describe role of CMR in its diagnosis, and identify CMR findings that support its diagnosis.
 - c. Name the most common benign primary cardiac tumors, including myxoma, lipoma, fibroma and rhabdomyoma.
 - d. Name the most common malignant primary cardiac tumors, including angiosarcoma, rhabdomyosarcoma and lymphoma.
 - e. Distinguish cardiac tumor from thrombus on CCT and CMR.
 - f. Name the most common malignancies to metastasize to the heart, and describe the appearance on a chest radiograph, CCT and CMR.
 - g. Describe the advantages and limitations of echocardiography, CCT and CMR for evaluation of cardiomyopathy and cardiac tumors.
 - h. Recognize calcification of papillary muscles as distinct from myocardial calcifications and describe the significance of each.
3. Cardiac Valvular Disease
- a. Identify and describe the findings of each on CCT and CMR
 - Enlarged right atrium
 - Enlarged left atrium
 - Enlarged right ventricle
 - Enlarged left ventricle
 - b. Describe and recognize the CCT/CMR findings associated with each of the following valvular diseases:
 - Mitral regurgitation
 - Mitral stenosis
 - Aortic regurgitation
 - Aortic stenosis
 - Tricuspid regurgitation
 - c. Recognize an enlarged ascending aorta and aortic valve calcification on CCT and CMR and suggest the diagnosis of aortic stenosis when these are present.
 - c. Recognize an enlarged left atrium, vascular redistribution, and mitral valve calcification on CCT/CMR and suggest the diagnosis of mitral stenosis when these are present.
 - d. State the common etiologies of the following:
 - Aortic stenosis
 - Aortic regurgitation
 - Mitral stenosis
 - Mitral regurgitation
 - Tricuspid regurgitation
 - Pulmonary stenosis
 - e. Name the cardiac diseases associated with mitral annular calcification.
 - f. Identify endocarditis or complications of endocarditis on CCT/CMR.

- g. Describe the advantages and limitations of echocardiography and CMR in the evaluation of valvular heart disease.
 - h. Describe the pulse sequences and appropriate planes for evaluating cardiac valvular disease and making quantitative measurements including flow, gradients, regurgitant fractions, and valve areas.
4. Pericardial Disease
- a. Recognize pericardial calcification on CCT and name the most common causes.
 - b. Name five causes of pericardial effusion.
 - c. Describe and recognize the findings of each of the following on CCT and CMR:
 - Pericardial cyst
 - Constrictive pericarditis
 - Pericardial hematoma
 - Pericardial metastasis
 - Partial or complete absence of pericardium
 - Pneumopericardium
 - d. Describe the role of CMR in diagnosing constrictive pericarditis and differentiating constrictive pericarditis from restrictive cardiomyopathy.
5. Congenital Heart Disease in the Adult
- a. Recognize and describe the following on CCT and CMR
Heart disease presenting during adulthood:
 - Left-to-right shunts and Eisenmenger physiology
 - Atrial septal defect
 - Ventricular septal defect
 - Partial anomalous pulmonary venous connection
 - Patent ductus arteriosus
 - Coarctation of the aorta
 - Tetralogy of Fallot and pulmonary atresia with ventricular septal defect
 - Congenitally corrected transposition of the great arteries
 - Persistent left superior vena cava
 - Truncus arteriosus
 - Ebstein anomaly
 - Cardiac malposition, including abnormal situs
 - Coronary artery anomaliesHeart disease originally treated in childhood:
 - Coarctation of the aorta
 - Tetralogy of Fallot and pulmonary atresia with ventricular septal defect
 - Complete transposition of the great arteries
 - Congenitally corrected transposition of the great arteries
 - Truncus arteriosus
 - Commonly performed surgical corrections for congenital heart disease
 - b. Define the role of angiography, echocardiography, CCT and CMR in the evaluation of an adult patient with congenital heart disease, including the advantages and limitations of each modality depending on patient presentation.
6. Postoperative thorax
- a. Identify normal postoperative findings and complications of the following procedures on CCT and CMR:
 - Coronary artery bypass surgery

- Cardiac valve replacement
- Aortic graft
- Aortic stent
- Heart transplantation

7. Non-cardiac findings

- Review all CCT cases for non-cardiac findings
- Review dedicated teaching file of 25 CCT cases featuring of significant non-cardiac pathology
- Attend specific lectures on non-cardiac CT pathology

PRACTICE-BASED LEARNING

1. Participate in CT/MR conferences and case presentations.
2. Incorporate CT/MR into case presentations during other cardiology conferences.
3. Fellows are responsible for being present in the MRI or CT labs from 8:00 am – 5:00 pm on a daily basis. Fellows must inform attendings of necessary absences in advance. Fellows are expected to be present at all MRI and CT acquisitions unless the two conflict. MRI acquisitions take precedence.
4. Fellows are expected to attend all the official case reading sessions with attendings at roughly 9 AM and 1 PM daily. They should have read these cases independently to the extent possible before the attending, and be prepared to present a brief clinical synopsis of the indications for each study and their own interpretation. Fellows must complete a reading form on each case and save this for credentialing. This will form a majority of basis of their monthly evaluation on-line and for ACC/AHA competency evaluation.
5. Fellows are expected to present cases weekly at the Thursday morning advanced imaging conference. There will be one long presentation, which will be on a particular topic supported by WBH case material, literature review and discussion. There should be at least 2 short cases, and fellows can alternate long and short with their colleagues.
6. Fellows are expected to review and interpret CT and MR studies from our CT/MR library.
7. Participate in Quality Assurance activities.
8. Attend the CMR physics course.

INTERPERSONAL & COMMUNICATION SKILLS

1. Communicate effectively with referring physicians and technical staff using appropriate CCT/CMR nomenclature.

SYSTEMS-BASED PRACTICE

1. Utilize ACC/AHA documents for didactic education.
2. Incorporate suggested reading:
 - a. Cardiovascular Magnetic Resonance, WJ Manning, DJ Pennell ed. Churchill Livingstone, 2002
 - b. Cardiovascular MRI and MRA, CB Higgins, A De Roos, ed. Lippincott Williams and Wilkins, 2003
 - c. Case study files, CMR department
3. Use SCMR Educational website and related links.
4. Review CCT SAP and CMR SAP.

PROFESSIONALISM

1. Maintain professional interactions with technicians and physicians.

B. EVALUATIONS

1. Each fellow is to be evaluated on a monthly basis at the end of the CT/MR rotation as follows (360° Evaluation):
 - a. A formal evaluation will be completed by the CT/MR attending(s) in New Innovations, and the content of the evaluation will be reviewed verbally with the fellow. Deficiencies must be forwarded to the Program Director. Fellows will also be evaluated by Ralph Gentry at the end of each rotation. Fellows will also evaluate his/her performance in the context of the goals and responsibilities for this rotation.
 - b. Dr. Raff must sign the procedure-credentialing log at the end of the month, and a copy of the form must be filed with the Fellowship Coordinator.
2. The CT/MR fellow(s) will complete a formal evaluation of the CT/MR attending(s) each month, using New Innovations. This evaluation will be reviewed on an annual basis with the Program Director and Chief of Cardiology.

C. CREDENTIALING

1. Fellows MUST maintain a log of all CT/MR studies performed. Dr. Raff must sign this log at the end of the month, and a copy placed in the Fellow' file. Routine certification is not provided.
2. ACC/AHA Competency Requirements:
 - a. Onsite attendance
 - i. CT: 8 weeks
 - ii. MRI: 3 months
 - b. didactic instruction: 20 hours
 - c. live acquisitions and interpretations: 50 cases
 - d. additional cases from teaching library: 100 cases
 - e. all activities require written documentation
3. Fellows are expected to complete the ACC/AHA requirements for didactic education. Part of this consists of the CT and MRI Registry Review manuals including test questions that are supplied at the beginning of the rotation. When answers to a chapter are turned in to Dr. Raff's secretary, fellows receive the correct answers and a study guide explaining each. Fellows are expected to complete both manuals over 3 months, except for the chapters on anatomy. The CT manual must be completed during the first month, and the MRI manual must be completed over 3 months (1/3 during each).

G. SUGGESTED READING MATERIALS

- a. Cardiovascular Magnetic Resonance, WJ Manning, DJ Pennell ed., Churchill Livingstone, 2002
- b. Cardiovascular MRI and MRA, CB Higgins, A De Roos, ed., Lippincott Williams and Wilkins, 2003
- c. Case study filed, CMR department

Table 1. ACC/AHA Competency Levels

Modality	Competency Level	Cumulative Duration of Training	No. of Examinations (present for acquisition)	No. of Examinations (interpretation)
Cardiac CT	Level 1	1 month	25	50
	Level 2	2 months	35	150
	Level 3	6 months	100	300
Cardiac MRI	Level 1	1 month	25	50
	Level 2	3 months	50	150
	Level 3	12 months	100	300

CARDIAC REHABILITATION/PREVENTIVE CARDIOLOGY (ELECTIVE)

Directors: Barry Franklin PhD

Teaching Faculty: J. Yanez MD

OBJECTIVES

1. To understand exercise principles, exercise prescription, stress testing, secondary prevention, metabolic calculations, risk factor modification, and nutrition.
2. To learn how to monitor and interpret graded exercise stress tests with specific emphasis on indications, contraindications, choosing appropriate protocols (e.g., treadmill, cycle ergometer, arm ergometer), normal and abnormal physiologic responses, test endpoints, cool-down procedures, and emergency measures. Fellows also gain exposure to pharmacologic stress testing (e.g., persantine, dobutamine), that are covered in greater depth in other rotations (i.e. nuclear medicine, echocardiography).
3. To learn the services, procedures and logistics for processing patients through inpatient and outpatient cardiac rehabilitation. This includes the history, lipid profiling, body composition testing, exercise evaluation, metabolic assessment (measurement of oxygen consumption), and formulation of the exercise prescription.
4. To learn the referral process (e.g., risk factor forms, exercise prescription data sheets) associated with outpatient programming.
5. To gain exposure to Phase II (telemetry-monitored exercise therapy) and Phase III rehab.
6. To identify patients at high risk for cardiovascular disease and to recommend specific primary preventive measures.
7. To implement cardiovascular risk reduction through diagnosis and treatment of hypertension, dyslipidemia, thrombosis, diabetes and obesity.
8. To understand the importance of smoking cessation, nutrition and its effects on the cardiovascular system, and psychosocial and behavioral aspects of cardiovascular disease.
9. To understand external counterpulsation (EECP) and its role in the treatment of CAD.

TEACHING STRATEGIES

1. The Cardiac Rehab/Preventative Cardiology teaching service consists of several attending physicians and one cardiology fellow.
2. Direct hands on experience in the performance of exercise tests, cardiac rehabilitation classes, and EECP.
3. One-to-one instruction with the teaching faculty to discuss selected topics in exercise physiology, exercise testing, cardiovascular rehabilitation, nutrition, and risk factor modification.
4. Active participation in the Preventative Cardiology Clinic.
5. Formal instruction in the interpretation of stress ECG.

FACULTY RESPONSIBILITIES

1. Rehabilitation faculty meet regularly with the fellows during their rotation to discuss selected topics including: ECG's, resting and exercise physiology, exercise prescription, cardiac rehabilitation, metabolic assessment (e.g., measurement of oxygen consumption, anaerobic threshold), chronotropic incompetence, recovery heart rate, Duke treadmill score, exertional hypotension, coronary risk factor modification, and related rehabilitation topics.
2. Guidance in formulating proposals is provided for fellows interested in conducting independent research in this area.

3. At the beginning of the rotation, the Medical Director will verbally review the goals, objectives, and responsibilities with the fellow. The Fellowship Coordinator will maintain a signature log confirming that this meeting has occurred.
4. At the end of each rotation, the Medical Director will meet with the fellow and verbally review the written evaluation and performance. The Fellowship Coordinator will maintain a signature log confirming that this meeting has occurred.
5. Provide formal instruction in 2-5 stress ECGs per day.

D. FELLOW RESPONSIBILITIES:

PATIENT CARE

1. Monitor patients undergoing exercise tests and rehabilitation classes.
2. Participate in the preventive cardiology clinic under the direction of Dr. Peter McCullough and staff.
3. Identify patients at high risk for cardiovascular disease, and recommend appropriate measures for primary and secondary prevention.
4. Attend and observe at least one “patient planning session” with a behavioral psychologist for a prospective weight reduction patient.
5. Attend and observe at least one “group patient session” led by a behavioral psychologist for weight reduction patients.
6. Attend and observe at least one “instructions session” led by a nurse-clinician on how to initiate a meal replacement diet for significant weight reduction.
7. Attend and observe at least one “nutrition class” led by a registered dietician for weight reduction patients.
8. Attend and observe at least one “personal consultation for exercise therapy” led by an exercise physiologist for a weight reduction patient.
9. Formal reading and interpretation of 2-5 stress ECGs per day.

MEDICAL KNOWLEDGE

1. Become familiar with cardiovascular risk reduction, lipid subfractionation, novel risk factors, obesity management, nutrition, psychological and exercise counseling, meal replacement approaches, indications for bariatric surgery, and risk and assessment.
2. Understand principles of exercise physiology, normal and abnormal physiological responses, and use of pharmacologic stress tests.
3. Learn how to screen young athletes for risk of sudden cardiac death, and how to prevent it.

PRACTICE-BASED LEARNING

1. Participate in all required Cardiology conferences.
2. Participate in regular didactic sessions with Cardiac Rehab/Preventative Cardiology faculty.

INTERPERSONAL & COMMUNICATION SKILLS

1. Interact with the attendings, nursing staff, and technical staff to ensure a “team” approach, and identify and resolve any issues that arise.
2. Communicate with the patient and family to provide thoughtful recommendations about risk factor modification and primary/secondary prevention.

SYSTEMS-BASED PRACTICE

1. Read and implement ACC/AHA guidelines for risk assessment, risk factor modification, and exercise testing.
2. A suggested reading list is available on request.

PROFESSIONALISM

1. Always maintain a positive and professional attitude towards the patient.
2. Maintain professional interaction with the nursing staff, technicians, and physicians.

E. EVALUATIONS

6. Fellows will be observed during performance of exercise stress testing and given verbal feedback regarding technique, patient interactions, and interpretation of ECG tracings.
7. Fellows will be given verbal feedback on their performance in clinic and on their grasp of preventive cardiology concepts.
8. At the end of each rotation, the attending and fellow will meet formally to review the attendings evaluation of fellow performance. The attending will complete a formal evaluation using New Innovations.
9. At the end of each rotation, the fellow will complete a formal evaluation of the attending using New Innovations, which will be used in the annual review of the attending by the Program Director and Chief of Cardiology.
10. The fellow will evaluate his/her own performance in the context of the goals and responsibilities for this rotation.

F. CREDENTIALING

No credentialing is necessary

OUTPATIENT SERVICE (elective)
Note: 3rd Year Fellows Only

Teaching Faculty: Steve Ajluni MD, Steve Almany MD, Aaron Berman MD, Amr Abbas MD

A. OBJECTIVES

1. To develop skills for outpatient management of patients with cardiovascular diseases.
2. To acquire skills in physical examination pertaining to the heart, lung, brain and vascular systems.
3. To become expert in the assessment and treatment of risk factors for ischemic heart disease (smoking cessation, hypertension, hyperlipidemia, obesity, diabetes).
4. To perform a thorough cardiovascular assessment as part of preoperative cardiac clearance.
5. To recognize the need for non-cardiac consultations to manage cardiac patients with non-cardiac problems.
6. To interpret non-invasive studies in an outpatient practice environment.

B. TEACHING STRATEGIES

1. The teaching strategies employed during this elective rotation are identical to the ones employed during the hospital-based continuity clinic. However, this elective rotation will place greater emphasis on the interpretation of outpatient non-invasive imaging.
2. The Outpatient Clinic rotation consists of one cardiology attending and 1-2 cardiology fellows per half-day session.
3. The teaching strategy relies on a one-to-one interaction between the fellow and the attending in the setting of a busy clinical cardiovascular practice.
4. The teaching model involves the fellow performing a detailed history and physical examination; cogent presentation of the findings to the attending; review of pertinent noninvasive and invasive data; and a joint visit with the patient to review pertinent historical or physical findings, to make further recommendations for evaluation and treatment.
5. In addition to the oral presentation described above, the fellow will dictate a focused letter to the referring doctor, detailing the information and recommendations above. The letter gives the fellow an opportunity to synthesize all available information, and to design a treatment plan for each patient. Each dictation is reviewed and corrected by the attending, reviewed by the fellow, and then mailed to the referring doctor.
6. The scope of the outpatient curriculum is similar to that of the inpatient service, although the acuity of the patients is less. See pages 58-59 for more details.

C. ATTENDING RESPONSIBILITIES

1. Supervise the fellow's interaction with the patients.
2. See all patients, and review pertinent physical and ECG findings when appropriate.
3. Teach fundamentals of ECG interpretation as they pertain to an outpatient setting.
4. Provide instruction in the indications for and interpretation of non-invasive and invasive tests.
5. Review and correct fellow dictations, providing appropriate feedback.
6. Help and supervise in the treatment of risk factors, and ensure appropriate monitoring.

D. FELLOW RESPONSIBILITIES

Upon completion of the rotation the fellow should have improved skills in the following areas:

PATIENT CARE

1. Perform a complete but focused cardiovascular history and physical examination for all new patients and followups.
2. Present all patients to the Attending, focusing on the cardiovascular aspects and pertinent non-cardiac medical problems.
3. See 3-5 new patients and 5-10 return patients per half-day of continuity clinic.
4. Read and interpret ECGs for their patients.
5. Assist nursing staff in responding to questions from patients and families.
6. Recognize the need to address psychosocial and financial issues, and enlist the support of appropriate hospital resources.
7. Obtain consultations from other medical and surgical services when indicated.

MEDICAL KNOWLEDGE

1. The knowledge base for management of the Outpatient Clinic is huge. The fellow is expected to demonstrate understanding of the pathophysiologic bases for diseases including:
 - a. acute coronary syndromes
 - b. acute myocardial infarction
 - c. chronic ischemic heart failure
 - d. acute and chronic heart failure
 - e. atrial and ventricular tachyarrhythmias
 - f. cardiogenic shock
2. In addition, fellows are expected to master the approach to the diseases listed above with respect to:
 - a. pharmacologic treatment
 - b. noninvasive education (ECG, echo, nuclear, CT, MR, etc)
 - c. invasive EP evaluation and device treatment
 - d. cardiac catheterization, angiography, and intervention
 - e. cardiovascular surgery, including CABG, valve replacement, valve repair, and surgical approaches to arrhythmia
3. Fellows must master the principles of:
 - a. risk assessment and risk factor modification
 - b. cardiovascular pharmacology
4. Fellows should acquire and begin to develop the knowledge base for other sophisticated cardiac and vascular disease, including:
 - a. peripheral arterial disease
 - b. stroke
 - c. pericardial disease
 - d. acute and chronic aortic diseases
 - e. non-atherosclerotic cardiac and vascular diseases
 - f. complex arrhythmia diagnosis and treatment
5. Study and implement ACC/AHA guidelines as they relate to patients on the Outpatient Clinic.

PRACTICE-BASED LEARNING

1. Complete billing forms, order blood work, invasive and non-invasive test, and dictate a letter to the referring physician.

2. 1st and 2nd year fellows will follow the same patients for 2 years, 3rd year fellows can work in blocks of 6 months duration.

INTERPERSONAL & COMMUNICATION SKILLS

1. Communicate effectively with the patient and family to keep them apprised of the patient's condition and progress.
2. Interact with the paramedical support staff, nurses, nurse practitioners, and attendings to strengthen the "team" approach, and identify and resolve any problems that arise.
3. Explain indications, contraindications, risks, benefits, and alternatives for noninvasive and invasive diagnostic and therapeutic procedures.
4. Work with the office staff to ensure timely scheduling of tests, procedures, and follow-up.

SYSTEM-BASED PRACTICE

1. Fellows are expected to utilize a broad approach to expanding their educational goals, and while excellent resources are readily available among the teaching faculty, fellows are expected to review, study, master, and implement ACC/AHA guidelines in many areas, including:
 - a. acute MI, acute coronary syndromes
 - b. congestive heart failure
 - c. valvular heart disease
 - d. atrial fibrillation
 - e. cardiac catheterization and intervention
 - f. cardiac surgery
 - g. pacemakers and implantable devices
 - h. risk factor modification
2. Recognize his/her limitations and identify when to appropriately consult.
3. Utilize principles of disease treatment and prevention in order to improve medical care for patients.
4. Coordinate care for patients and ensure a smooth transition at the time of discharge from the hospital.
5. Web-based resources provide high-quality information that is readily available on demand, and are accessible via all hospital computers and Beaumont Medical Libraries. These resources include EPOCRATES, UpToDate, MDConsult, and PubMed

PROFESSIONALISM

1. Always maintain a positive and professional attitude towards the patient, family, and referring physician.
2. Maintain regular and professional interaction with the nursing staff and attending physician. It is important to try to incorporate the nursing staff into important decision-making, since nurses often have the most insight into the patient's needs.
3. Special attention needs to be paid to patients and their families when dealing with end-of-life issues. It is important to ensure that patients are treated with compassion, respect, and honor, and that they and their families do not feel abandoned. Many hospital resources are available, and patients and families should be encouraged to use them.

E. EVALUATIONS

1. Each fellow will evaluate the attending on a semi-annual basis, using New Innovations.

2. The attending will evaluate the fellow on a semi-annual basis, using New Innovations. The evaluation will be reviewed with the fellow. The fellow will evaluate his/her performance in the context of the goals and responsibilities for this rotation.

F. CREDENTIALING FOR PROCEDURES

No credentialing is necessary.

CARDIOVASCULAR SURGERY ELECTIVE

Director: Nicholas Tepe, MD
Teaching Faculty: Michael Faulkner, MD, Nicholas Tepe, MD, Marc Sakwa, MD, Frank Shannon, MD, Jeff Altshuler, MD, Phil Robinson, MD
Clinical Team: Cardiovascular Surgery Attending Physician, Cardiac Anesthesiologist, Clinical Cardiology Fellow, CV Surgery Nurse Practitioners

G. OBJECTIVES

1. Acquire skills for appropriate patient selection for coronary artery bypass and valve surgery; recognize the difference between low, intermediate and high risk surgical candidates.
2. Understand the pathophysiology, clinical presentation, and indications for surgery in severe coronary artery disease and valve disease, as well as the factors that impact appropriate timing of surgery
3. Write, present, and dictate a concise and well-focused cardiovascular surgical consultation.
4. Understand the principles of proper patient preparation for cardiovascular surgery
5. Understand the scope of the surgery for a wide variety of procedures: coronary artery bypass surgery, valve repair/replacement via a standard sternotomy, valve surgery via a minimally invasive surgery, surgical MAZE procedures, aortic surgery, transcatheter valve approaches
6. Know various surgical approaches to the chest, including contra-indications for each
7. Understand intraoperative hemodynamic assessment
8. Be familiar with the basic principles of cardiopulmonary bypass
9. Understand cardiac anatomy, pathology via direct surgical inspection.
10. Identify and manage post-operative cardiovascular care and complications (SICU)
11. Become familiar with the discharge process and planning, as well as the early post discharge care guided by the CV Surgeon

H. TEACHING STRATEGIES

1. The Cardiovascular Surgery Service will consist of one CVS surgical attending, one Cardiac Anesthesiologist, one clinical cardiology fellow, CVS nurse practitioners, one or more medical residents, and one or more medical students.
2. This rotation incorporates all aspects of Cardiovascular surgery, including preoperative consultative surgical evaluations, understanding of all non invasive and invasive diagnostic and therapeutic modalities, intra operative assessment (hemodynamic, imaging and surgical), and postoperative assessment and management of critically ill patients.
3. The scope of potential learning opportunities is extremely broad, and includes: proper patient selection for open heart surgery, understanding the scope of the surgery and surgical approach to the chest, recognition and understanding of the importance of intraoperative hemodynamic assessment and intraoperative imaging, familiarity with the principles of cardiopulmonary bypass, as well as the complexities of early and late postoperative care of surgical patients.
4. In order to meet the demands of such a broad array of patients, teaching strategies incorporate all potential teaching opportunities, including:

- a. Structured CVS surgical attending rounds on patients in the surgical intensive care unit as well as the surgical progressive units. Fellows are encouraged to participate in as many rounding sessions as able, in order to gain an understanding of the objectives for the rotation, as well as to see the entire spectrum of care.
- b. Patient management and care is conducted by the CVS surgical team; fellows will not have direct responsibility for active patient management.
- c. Fellows are encouraged to contact the Cardiac anesthesiologist (and/or CVS surgeon) on the morning of (or day prior) scheduled surgical cases they wish to observe. This will allow proper planning to allow fellows the opportunity to perform invasive procedures (arterial lines, swan ganz catheter placement, TEE probe insertion and initial imaging opportunities, central venous access, etc). Fellows should also scrub in to a broad variety of cases to perform direct inspection of surgical anatomy and pathology.
- d. Fellows are encouraged to contact the CVS schedule coordinators (Vicky, et al; 8-0123) to choose "clinic days" to work with a Cardiovascular Surgeon: emphasis on preoperative evaluations (office and inpatient consultation), patient selection and early postoperative office based care.
- e. Ernst Conferences: Fellows are encouraged to participate in Monday (7am) Ernst Multi-disciplinary surgical conferences, as well as Wednesday (7am) Vascular surgical conferences in the Ernst Center.
- f. The fellow will be expected to prepare and present one conference during the month (Ernst monthly noon conference) with the goal of discussing complex surgical patients requiring multi-disciplinary decision making: CVS surgery, clinical and interventional cardiology, imaging and anesthesiology participation
- g. Participation in all required Cardiology conferences, including daily noon conference, weekly cath conference, monthly M&M conference, and monthly Grand Rounds.
- h. Fellows are encouraged to review and implement appropriate guidelines for care and treatment of all cardiology and vascular problems. Formal guidelines from ACC, AHA, SVS, ACP, etc are available from web-based resources in the Beaumont Medical Library. Other web-based resources are excellent sources for self-study, and include EPOCRATES, UpToDate, and MDConsult.

I. ATTENDING RESPONSIBILITIES

1. The attending CVS surgeon and/or anesthesiologist are responsible for all aspects of patient care
2. The attending physicians are encouraged to allow fellows to independently evaluate and make decisions on pre-operative inpatient and office based evaluations and consultations
3. Teach pre and postoperative patient selection decision making and management
4. Provide guidance on the indications, implications, complications, and limitations of cardiac surgery
5. Allow fellows to observe (and/or participate in) daily morning rounds on postoperative cardiac patients
6. Attending CVS surgeon (and anesthesiologist) will help the fellow choose appropriate surgical cases to observe/scrub, as well as appropriate days to work with the fellow in the clinic

7. The CVS Surgical Service attendings (Dr Tepe and Faulkner) will meet with the fellow at the beginning of the rotation to verbally review the fellows goals and help coordinate their desired schedule (clinics, surgery, rounds, etc)

J. FELLOW RESPONSIBILITIES

1. Fellows will meet with the CVS team (cardiac anesthesiologist, CVS surgeon, CVS physician extenders) as outlined above. Emphasis will be placed on understanding the pathophysiology, clinical presentation, and indications for surgery in severe coronary artery disease and valve disease, as well as intra and postoperative management of such patients.
2. Fellows will receive instruction on how to manage cardiac surgical patients. The CVS service will be managed by the CVS attending and physician extenders. Fellows will be encouraged to incorporate and to explain the findings of noninvasive and invasive cardiac testing (ie. transthoracic and transesophageal echocardiography, stress testing, cardiac magnetic resonance imaging, and cardiac catheterization). Fellows will be expected to participate in educational discussions with the CVS team.

PATIENT CARE

1. Demonstrate an awareness of physical exam findings in cardiac diseases, create a reasonable differential diagnosis, and develop an approach to the management of surgical patients.
2. Discuss the care plan and progress during attending rounds.
3. Demonstrate the ability to appropriately utilize the ICU for proper postoperative care and management of patients with cardiovascular instability from one or more of the following (common arrhythmias, tamponade, low cardiac output, postoperative bleeding, pulmonary problems, low urine output, CNS complications).
4. Continue to develop and improve technical skills in the operating room.

MEDICAL KNOWLEDGE

1. Know various approaches to the chest (sternotomy, mini-sternotomy, minimally invasive approaches for mitral and aortic valve surgery, etc) for common cardiac surgical procedures.
2. Understand the indications and role for preoperative studies (chest xrays, Chest CT scans, Pulmonary function testing, vascular testing, echocardiograms, angiography, etc).
3. Demonstrate understanding of pathogenesis, pathophysiology, treatment, and outcome of the disease processes most frequently encountered in CV surgery.
4. Understand the indications and guidelines for angioplasty vs. bypass surgery, choice of valvular procedures and approaches, etc.
5. Understand the basic theory and physiology of the heart lung machine (cardiopulmonary bypass).

Study and implement ACC/AHA guidelines as they relate to patients on Cardiovascular Surgical service.

PRACTICE-BASED LEARNING

1. Participate in daily rounds with the CVS team.
2. Attend all mandatory cardiology conferences, including monthly Cardiology Grand Rounds and M&M conferences, weekly Cardiac Catheterization conference, and daily Noon conferences. Fellows are encouraged to participate in CVS conferences (Ernst Cardiac Monday AM meetings, Ernst vascular surgery Wednesday AM meetings).
3. Demonstrate the ability to utilize scientific studies to provide high quality cardiac surgical care.

INTERPERSONAL & COMMUNICATION SKILLS

Demonstrate ability for accurate and timely information exchange between other members of the healthcare team.

SYSTEM-BASED PRACTICE

Fellows are expected to utilize ACC/AHA guidelines in the management of CV surgical patients. Web based resources are also available on demand and accessible via Beaumont hospital computers.

PROFESSIONALISM

Always maintain a positive and professional attitude towards the patient, family, and other members of the healthcare team. Interact with other members of the CVS team in a respectful, responsible and professional manner.

K. EVALUATIONS

1. Each fellow is to be evaluated on a monthly basis at the end of the Clinical Service rotation, as follows (360° Evaluation):
 - a. A formal evaluation will be completed by the Clinical Service attending(s) using New Innovations, and the content of the evaluation will be reviewed verbally with the fellow. Deficiencies must be forwarded to the Program Director. Fellows will be evaluated on a monthly basis by the Chief Fellow, the Chief Interventional Fellows, the Advanced EP fellow, the Medical residents, the Medical students, and by the Nurse practitioner on the Service. The fellow will also evaluate his/her performance in the context of the goals and responsibilities for the rotation.
 - b. On a yearly basis, the Fellows will take a written in-service examination on clinical cardiology and ECG interpretation, and will be expected to pass this examination.
2. The CV surgical fellow(s) will complete a written evaluation of the CVS Service attending(s) each month using New Innovations. This evaluation will be reviewed on an annual basis with the Program Director and Chief of Cardiology

L. CREDENTIALING FOR PROCEDURES

No credentialing process is necessary.