



Department of Internal Medicine

Cardiology Fellowship Training Program Manual

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Program Description

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History:

The University of Iowa Cardiovascular Disease Fellowship Training Program was formed in 1966-67. Since the program's inception, over 225 individuals have been trained.

Duration:

The Duration of the Cardiovascular Diseases Program is three years with 21 accredited positions in the general program emphasizing preparation in academic cardiology. Comprehensive training in all major aspects of clinical cardiology is combined with training in basic and clinical cardiovascular research. Opportunities exist in a variety of research disciplines. The University of Iowa Hospitals and Clinics has a tradition of medical excellence. The various facilities for clinical and research training includes the University Hospitals and Clinics, College of Medicine Medical Laboratories and Medical Research Center, Eckstein Medical Research Building and the VA hospital.

Prerequisite Training/Selection Criteria:

All fellow trainees selected for the Cardiovascular Diseases Fellowship Training Program are required to have completed an accredited three year residency program in internal medicine. Most fellowship trainees are usually selected through the NRMP (National Resident Matching Program).

Program Certification:

The Cardiovascular Diseases Fellowship Training Program is certified by the Accreditation Council for Graduate Medical Education (ACGME). All fellowship trainees are required to be licensed by the Iowa Board of Medical Examiners.

GENERAL INFORMATION

1. Mission Statement

The mission of the Fellowship Training Program in Cardiovascular Diseases at the University of Iowa is to provide an academically and clinically rigorous training program in general cardiology as well as advanced training in clinical cardiology subspecialties and cardiovascular research. The aims of the program are to provide the trainee with the basic and clinical knowledge, procedural skills, clinical judgment, professionalism and interpersonal skills, and abilities necessary to continue to hone these skills through the course of a long career, as required of a leader in cardiovascular medicine. The curriculum is designed to provide a broad clinical exposure in acute and chronic cardiovascular care occurring in the inpatient and outpatient settings, as well as extensive experience in non-invasive and invasive cardiac procedures. Fellowship training will prepare fellows to function not only as outstanding cardiologists, but also as either sub specialists in a clinical area or investigators in the field of cardiovascular research.

2. Training Structure

Fellowship training occurs over the course of 3 years. Two hospitals participate in this program: the University of Iowa Hospitals and Clinics and the Iowa City VA Medical Center. The training program offers advanced training in clinical subspecialties of cardiology (nuclear cardiology, echocardiography, cardiac catheterization/interventional cardiology, electrophysiology, heart failure/transplantation) as well as academic research training. All fellows must be intimately involved in a research project during the course of their fellowship (typically during the second year of training). Throughout all 3 years of fellowship training, fellows maintain half day continuity clinics usually alternating every week between UIHC and the Iowa City VAMC. Fellows rotate on a variety of inpatient and outpatient services as well as through the invasive and non-invasive laboratories and usually spend 12 months in a research laboratory or pursuing clinical research during the course of the training program. All fellows will achieve the level 1 certifications outlined in COCATS 2. An additional year of training is required for certification in Interventional Cardiology and Electrophysiology.

The organization of the training program is flexible, and may be tailored to individual fellow's goals and interests. However, all fellows are required to complete 24 months of clinical training. For most fellows, time is allocated for research during the second year of training. In occasional cases, specialized research training may occur prior to clinical training as a part of the fellowship training program. It is the intent of the fellowship administration to individualize training within the framework of ABIM, COCATS and ACGME guidelines to optimize each fellow's experience to achieve excellence in academic cardiology.

The core clinical training for the program is based on the ACC Revised Recommendations for Training in Adult Cardiovascular Medicine Core Cardiology Training II (COCATS II) published in 1995 and updated in 2002. A copy of the Executive Summary of COCATS 2 is available for review in Appendix I. Training is conducted in compliance with the Accreditation Council for Graduate Medical Education (ACGME) program requirements for general fellowship education in the subspecialties of Internal Medicine and the specific requirements for fellowship education in Cardiovascular Disease. These guidelines were last updated in July 2005 and can be reviewed on the ACGME website (www.acgme.org) under the 'Residency Review Committee' tab.

3. Facilities

The hospitals which form the core of this program function are both primary and tertiary care institutions.

The University of Iowa Hospitals and Clinics (UIHC) serves as a primary care hospital for much of southeastern Iowa and as a tertiary care center for Iowa, western Illinois and Northern Missouri. The patients from these institutions represent a wide variety of common and rare cardiovascular disorders and provide excellent exposure to all areas of cardiovascular medicine. UIHC has 3 cardiac catheterization laboratories, a separate electrophysiology (EP) laboratory, an echocardiography laboratory, ECG and stress testing area, nuclear cardiology perfusion imaging laboratory (managed by the Nuclear Medicine division, department of Radiology) and a congestive heart failure/transplant clinic.

The Iowa City VAMC serves as a primary care hospital for the state of Iowa, and as a tertiary care center for all of Iowa, western Illinois, northern Missouri, and eastern Nebraska. The VAMC has a newly renovated cardiac catheterization and electrophysiology laboratory, an echocardiography laboratory, and a stress testing laboratory. Nuclear cardiac perfusion imaging is provided by the Radiology Department.

CURRICULUM

1. Introduction:

The curriculum of the cardiovascular diseases fellowship consists of a variety of clinical experiences and didactic conferences that take place at both the UIHC and the VAMC. Fellows rotate on several inpatient services and outpatient services and provide both direct and consultative care. Fellows attend a weekly continuity clinic, alternating between the UIHC and VAMC Cardiology Clinic. For fellows interested in further training in congestive heart failure or training in adult congenital heart disease, a half-day weekly continuity clinic may be established in lieu of the VAMC clinic. Procedural skills are gained as fellows rotate through the invasive and non-invasive laboratories at both hospitals, and extensive experience in cardiac catheterization, echocardiography, and nuclear cardiac perfusion imaging is readily available.

Level 1 training in the emerging Cardiac CT/MRI techniques is readily available through the joint collaborative programs between the department of Radiology and Division of Cardiovascular Diseases. This training is acquired either on the noninvasive echo or nuclear rotation or during the outpatient rotation at the VAMC or during an elective rotation dedicated to advanced cardiac imaging.

Several conferences occur throughout the week, and a core curriculum lecture series is covered over a two year rotating cycle. Additionally, journal club takes place weekly and provides a forum to critically review the literature and to debate current topics in cardiology.

A final aspect of the curriculum involves fellow involvement in teaching. This occurs in several settings, including direct clinical teaching of Internal Medicine residents on the inpatient cardiology services (intensive care unit, heart failure service and consult service) as well as assisting in the early training of new cardiology fellows. Fellows are expected to give didactic lectures at cath conferences, cardiology clinical conference lecture series (cardiology grand rounds), board review lecture series and morbidity and mortality conference. Finally, fellows participate in teaching part of the ECG course to medical students under the direction of Dr. Donald Brown.

2. COCATS 2:

COCATS 2 (Core Cardiology Training Symposium) is the curriculum guiding document for fellowships in cardiovascular disease. This document consists of the reports of individual task forces which reviewed and made recommendations for training in each of 11 vital areas of cardiovascular disease. A brief description will be given as to how the University of Iowa Fellowship Program in Cardiovascular Disease addresses each Task Force's recommendations.

Task Force 1: Training in Clinical Cardiology

Extensive training in general clinical cardiology occurs both in the inpatient and outpatient and also in the laboratory and non-laboratory setting. The cardiology fellow is primarily responsible for the management of inpatients with cardiovascular diseases on the UIHC consult service, UIHC CVICU (intensive care unit), UIHC heart failure service, UIHC inpatient electrophysiology service, VAMC inpatient consult service and VAMC outpatient cardiology service. Training in procedural skills is acquired in the UIHC and VAMC cardiac catheterization laboratory, nuclear

medicine/cardiology laboratory, echocardiography laboratory and exercise testing laboratory. Outpatient consults and management of chronic cardiovascular disease takes place in the weekly continuity clinics at the UIHC and VAMC Cardiology Clinic.

Task Force 2: Training in Electrocardiography, Ambulatory Electrocardiography, and Exercise Testing

Fellows interpret ECG and Holter monitor recordings during the VAMC outpatient and inpatient rotation. Fellows interpret Holter monitor recordings during UIHC electrophysiology rotation. Fellows interpret ECG and stress tests on the UIHC Nuclear Cardiology rotation and UIHC stress echocardiography laboratory. Fellows directly supervise exercise stress tests during the VA Outpatient rotation and jointly supervise exercise stress tests at UIHC. These studies are then reviewed by the attending cardiologist. In addition, a four-week course in basic ECG interpretation is conducted at the beginning of training period and an ECG conference is held weekly at UIHC.

Task Force 3: Training in Diagnostic Cardiac Catheterization and Interventional Cardiology

All fellows complete at least 6 months in the cath labs. Additional two months are available for fellows during the UIHC intensive care unit and heart failure rotation. Fellows receive extensive training in vascular access, left and right heart catheterization, diagnostic coronary angiography, invasive hemodynamics, RV biopsy. A weekly Cath Conference is held during which faculty and fellows present teaching case and review angiographic and hemodynamic findings, discuss diagnostic and management issues, review complications and promote discussion of specific cardiology topics pertaining to invasive cardiology. Fellows seeking certification in Interventional Cardiology must do an additional year of training.

Task Force 4: Training in Echocardiography

Transthoracic and transesophageal echocardiography training occurs during the UIHC Echocardiography laboratory rotation and during the VA Outpatient and inpatient rotation. All fellows complete at least 3 months on these rotations to achieve level 1 certification. Additional months for Level 2 certification are available for fellows on elective rotations. All fellows receive training in exercise stress echocardiography, dobutamine stress echocardiography and transesophageal echocardiography after the first month of training in echocardiography. A weekly Echocardiography Conference is held that includes echocardiography case reviews and case specific didactic teaching. A series of lectures in echocardiography is also presented at the core curriculum lecture series.

Task Force 5: Training in Nuclear Cardiology

All fellows complete at least 2 months in the Nuclear Cardiology Lab; one month at UIHC and the remainder during half –day rotations during the two VAMC outpatient cardiology rotations. Fellows interested in achieving Level 2 certification may choose to take additional elective rotations and also participate in interpretation of studies during the two VA inpatient rotations. Once every three months, a multidisciplinary joint nuclear medicine – cardiology conference is conducted in the division of cardiovascular diseases to correlate angiographic findings with the perfusion results. Lectures in nuclear cardiology are provided by cardiology and nuclear medicine faculty.

Task Force 6: Training in Specialized Electrophysiology, Cardiac Pacing, and Arrhythmia Management

All fellows complete 2 months on the Electrophysiology (EP) service to achieve Level 1 EP training. Fellows wishing to practice Electrophysiology must complete an additional year of training dedicated solely to EP. The EP service covers all EP consults and procedures at both the University Hospital and the VAMC. Fellows evaluate inpatient consults at both hospitals; perform device interrogations with dedicated personnel for device interrogation and/or with the EP faculty physician. Fellows obtain informed consents, explain indications and contraindications of procedures and may assist with procedures performed in the EP laboratory usually during the senior year of training. A weekly EP Conference is held at UIHC to review interesting EP cases, basic EP topics. Hands-on sessions with the device representatives are scheduled at the beginning of each year to acquaint fellows with the device interrogation equipment. Also, basic EP topics are addresses during the core curriculum conference series.

Task Force 7: Training in Cardiovascular Research

The Cardiology Division is active in both clinical and basic science research. All fellows are encouraged to become involved in ongoing research projects. Research is an important and critical component of training in cardiovascular disease. The UIHC Division of Cardiovascular Diseases is at the cutting edge of basic science research and clinical research. At the present time, all of our fellows spend up to 12 months engaged in research usually during their second year of training. The fellows are carefully paired with mentors depending on fellow's research interests. In the future, this requirement will be expended or curtailed in accordance with ACGME guidelines and to tailor it to the individual trainee. Fellows are also encouraged to prepare and submit interesting clinical cases for publication. The opportunity to complete a dedicated 4th year of either clinical or basic science research is also available.

Task Force 8: Training in Heart Failure and Transplantation

All fellows complete 2 months on the heart failure/ transplant service. Fellows on this service admit and manage patients with cardiac transplant related issues or decompensated heart failure. Outpatient consults are performed on patients referred to the heart failure/ transplant clinic for assistance with heart failure management or for consideration of cardiac transplantation. Fellows may perform right heart catheterizations procedures and right ventricular endomyocardial biopsies on selected patients on this service.

Task Force 9: Training in the Care of Adult Patients with Congenital Heart Disease

All fellows attend clinics at the UIHC adult congenital heart disease clinic during the course of their fellowship. Fellows are under the supervision of the pediatric cardiology faculty members in the clinics and may follow the patients undergoing cardiac procedures. Additionally, lectures on congenital heart disease and their associated surgical procedures are given as a part of the core curriculum lecture series.

Task Force 10: Training in Preventive Cardiovascular Medicine

In addition to discussing prevention-related issues relevant to individual patients seen on the inpatient services or in the outpatient clinics, dedicated lectures on Preventive Cardiovascular Medicine are provided to the fellows as a part of the core curriculum lecture series. These lectures cover cardiovascular (CV) genetics, clinical epidemiology and biostatistics, principles of clinical trials, principles of outcomes research, principles of clinical pharmacology, principles of behavior change and aspects of compliance, and principles of disease management and multidisciplinary system development. The specific content areas defined by the task force are HTN, hyperlipidemia, thrombosis/hypercoagulable states, smoking cessation, cardiac rehabilitation, exercise physiology, nutrition, psychosocial and behavioral aspects of CV disease, metabolic disorders, gender and racial differences as related to CV disease, and population demographics as related to CV disease. Over a rotating two year period, the content areas outlined by this task force are addressed through core curriculum conference series, review of current literature in the journal club setting, state of the art review and controversial topics in the cardiology grand rounds lecture series. Both UIHC faculty and nationally and internationally renowned guest speakers provide an added dimension in discussing these topics with our trainees.

Task Force 11: Training in Vascular Medicine and Peripheral Catheter-based Interventions

Although a dedicated rotation in Vascular Medicine is currently not available; we have recently started sending fellows for one half day per week during the nuclear cardiology rotation to vascular medicine laboratory to learn the indications for screening, performance and interpretation of carotid artery, renal artery, and lower extremity peripheral artery disease is emphasized. Percutaneous renal and lower extremity angiograms and interventions are performed in the Cath Lab. Fellows may assist with the diagnostic angiogram. In addition, a combined Cardiology-Vascular Surgery Conference which has been recently implemented. The basic concepts in Vascular Medicine are reviewed in a multidisciplinary setting.

3. **Procedure Certification:**

Certification levels are defined by COCATS 2 as follows:

Level 1: Basic training required of all trainees to be competent consultant cardiologists.

Level 2: Additional training in one or more specialized areas that enables the cardiologist to perform or interpret (or both) specific procedures at an intermediate skill level or engage in rendering cardiovascular care in specialized areas.

Level 3: Advanced training in a specialized area that enables a cardiologist to perform, interpret, and train others to perform and interpret specific procedures at a high skill level.

In general, level 2 certification is required to independently interpret and/or perform a specific cardiac procedure and level 3 certification is required to run a procedure-related laboratory.

All fellows are required to maintain detailed documentation of the procedures they perform as described in the "Procedure Documentation" section of this manual. This procedure log is to be turned in twice a year to be reviewed by the program director during the fellow's biannual evaluation.

4. **ACGME Core Competencies:**

The curriculum is designed to meet the required core competencies as defined by the ACGME. The core competencies that must be demonstrated are:

- A. PATIENT CARE:** Fellows must be able to provide patient care that is compassionate, appropriate, and effective in the treatment of health problems and the promotion of health.
- B. MEDICAL KNOWLEDGE:** Fellows must demonstrate knowledge about established and evolving biomedical, clinical, and cognate (e.g. epidemiological and social-behavioral) sciences and the application of this knowledge to patient care.
- C. PRACTICED-BASED LEARNING AND IMPROVEMENT:** Fellows must be able to investigate and evaluate their patient care practices, appraise and assimilate scientific evidence, and improve their patient care practices.
- D. INTERPERSONAL AND COMMUNICATION SKILLS:** Fellows must be able to demonstrate interpersonal and communication skills that result in effective information exchange and teaming with patients, their patients' families, and professional associates.
- E. PROFESSIONALISM:** Fellows must demonstrate a commitment to carrying out professional responsibilities, adherence to ethical principles, and sensitivity to a diverse patient population.
- F. SYSTEMS-BASED PRACTICE:** Fellows must demonstrate an awareness of and responsiveness to the larger context and system of health care and the ability to effectively call on system resources to provide care that is of optimal value.

The curriculum assures the teaching and assessment of these competencies, and the following listing of general core competency elements applies to all rotations of the fellowship. Core competency-related teaching and assessment that is specific to individual rotations will be identified in the “Objectives” section of the curriculum for each rotation.

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 give a formal grand rounds lecture during their third year of fellowship.
6. Fellows will present an article yearly at Journal Club.
7. Fellows will maintain a thorough procedure log to document technical skills training.

8. Fellows are expected to attend at least 80% of teaching conferences that are designed to cover a thorough curriculum in cardiovascular diseases.
9. Each fellow will have the opportunity to attend a national meeting once a year.
10. Fellows present patients to the attending and are directly observed while performing invasive procedures.

Practice-Based Learning and 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. Fellow 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 that will be developed.

Systems-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.

5. CONFERENCES:

The training program provides didactic instruction in the following specified topics, with which each fellow is expected to demonstrate a good understanding.

1. Basic science
 - a. Cardiovascular anatomy
 - b. Cardiovascular physiology
 - c. Cardiovascular metabolism
 - d. Molecular biology of the cardiovascular system
 - e. Cardiovascular pharmacology
 - f. Cardiovascular pathology
2. Prevention of cardiovascular disease
 - a. Epidemiology and biostatistics
 - b. Risk factors
 - c. Lipid disorders
3. Evaluation and management of patients with:
 - a. Coronary artery disease and its manifestations and complications
 - b. Arrhythmias
 - c. Hypertension
 - d. Cardiomyopathy
 - e. Valvular heart disease
 - f. Pericardial disease
 - g. Pulmonary heart disease
 - h. Peripheral vascular disease
 - i. Cerebrovascular disease
 - j. Heart disease in pregnancy
 - k. Adult congenital heart disease
 - l. Complications of therapy
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
5. Diagnostic techniques, including:
 - a. Magnetic resonance imaging
 - b. Fast compute tomography
 - c. Positron emission tomography

Fellows are expected to make a concerted effort to attend as many conferences as possible. As there is a conference offered every day, Monday-Friday, fellows may not be able to attend all conferences. Fellows are expected at the least to attend the Tuesday Core Curriculum conference, the Wednesday Clinical Conference, and Journal Club weekly. Conference attendance at the various subspecialty conferences in EP, electrophysiology, echocardiography, are encouraged for all fellows and are mandated for fellows on the subspecialty rotations.

WEDNESDAY 7:30 AM CLINICAL CONFERENCE / GRAND ROUNDS– Fellows are expected to participate in case presentations and discussions. Each fellow will be assigned one conference per year. This conference should be prepared with a mentor. Invited guest speakers and cardiology faculty provide updates and reviews of major topics in cardiology. Attendance is mandatory. CME credit is provided.

CORE CURRICULUM – Tuesdays 1:00 – 2:00 PM in the Marcus Conference Room. During the course of the academic year, the fundamental, core material in Cardiovascular Medicine is covered in this lecture series. Lunch is provided. Attendance is mandatory. Core curriculum lectures occur throughout the year covering all major topics on cardiovascular disease. During the first two months of each academic year, a basic introduction to ECG, device interrogation and other topics like cardiac emergencies (acute myocardial infarction), emergent procedures, etc., are conducted to help orient the new fellows and prepare them for issues routinely encountered on call.

ECG TEACHING CONFERENCE – Mondays 7:00 AM in the Marcus Conference Room. Fundamentals of ECG interpretation and arrhythmia evaluation covered over the course of the academic year. All fellows receive a copy of the ACCSAP –ECG which is reviewed at this conference. This conference is conducted by Dr. Martins after the basic ECG conference course is completed by Dr. Brown in the first 6 weeks of the academic year.

BOARD REVIEW – This conference is arranged by the Chief Fellow. ACCSAP and Mayo Board review literature is reviewed. This is a relatively new conference which will be conducted once a month for approximately 8 months/ year.

CARDIOLOGY JOURNAL CLUB – Meets on Friday morning at 7:00 AM in the GI Conference Room 4th Floor Roy Carver Pavilion. Fellows review recent journal articles. The article(s) to be presented are at the discretion of the presenter but the supervising journal club physician may provide the requisite input for selection of recent articles. The main goal of journal club is to help fellows learn to critically assess the literature and to facilitate the practice of evidence-based medicine. The articles reviewed usually cover emerging or controversial topics in cardiology. Breakfast is provided. All fellows are required to attend the Journal Club.

CATHETERIZATION LAB CONFERENCE – Meets on Thursday morning at 7:00 AM in the GI Conference Room. Fellows on the Cardiac Catheterization Services will be assigned on a rotating basis to coordinate the presentation of catheterization-based topics. Breakfast is provided. Attendance is mandatory during the UIHC Cath Lab rotation. These conferences are coordinated with the joint cardiothoracic surgery /Cardiac Cath Lab conference.

CARDIAC CATH – TCV CONFERENCES – Held on the 2nd and 4th Tuesday of the month at 7:15 am for at least 8 months of the year. Complex cases and controversial topics related to percutaneous/surgical revascularization and valve surgery are discussed. Fellows on the cardiac Cath rotation are required to attend.

ELECTROPHYSIOLOGY/ BLUE JEANS CONFERENCE – Held on Thursdays at 5pm. This conference is conducted by the electrophysiology service attending physicians and the subspecialty EP fellow. The cardiology fellows rotating on the EP service are required to attend this conference and all other fellows on various rotations are encouraged to attend. Interesting cases, intra-cardiac EP tracing, basic EP topics are discussed in this conference.

ECHOCARDIOGRAPHY CONFERENCE – Held on Friday morning at 8:00 AM in the Echo Reading Room on 4JCP. This is accomplished by didactic presentations given by the echo faculty and by the interactive review of echocardiograms. Emphasis is placed on echo interpretation, understanding Doppler techniques and Doppler hemodynamics, limitations of echo, and quality assurance. Transesophageal and stress echo techniques and potential complications are also discussed.

MORBIDITY / MORTALITY CONFERENCE – One morbidity and mortality conference will be presented by the senior fellows. The attendance of the responsible staff physician is required for this conference. In addition, fellow's are encouraged to attend morbidity & mortality conferences (related to cardiovascular disease) organized by the Department of Internal Medicine.

RESEARCH CONFERENCE / WORK-IN-PROGRESS (WIP) – While on research rotations, fellows are asked to present on-going work at this conference, held on Monday afternoon at 4:00 PM in the Marcus Conference Room. Attendance is mandatory during the research phase of training.

INTERNAL MEDICINE GRAND ROUNDS occurs weekly (Thursday 1-2pm) and provides CME credit for faculty. Department of Internal Medicine faculty and invited guest speakers speak to the combined Internal Medicine Department and its subspecialty divisions on a wide variety of topics across all specialties and address several interdisciplinary topics (i.e. genetics, quality of care, patient safety, reducing medical errors, ethics in medicine). Other divisional and departmental conferences are posted weekly.

A complete list of Core Curriculum lecture topics is contained in Appendix II.

ROTATIONS

The following several pages will outline the specific curriculum for each rotation of the cardiovascular disease fellowship. For each rotation, the overall purpose, the fellow responsibilities and specific duties, method of supervision, learning objectives, patient characteristics, mix of diseases encountered, types of clinical encounters and procedures performed, teaching methods, evaluation methods, and bibliography will be described.

The various described rotations include:

1. VA Outpatient Cardiology
2. VA Inpatient Cardiology
3. VA Cardiac Catheterization Laboratory
4. UIHC Cardiology Consults
5. UIHC CVICU
6. UIHC Cardiomyopathy/Heart Failure/Transplant
7. UIHC Cardiac Catheterization Laboratory
8. UIHC Echocardiography
9. UIHC Nuclear Cardiology/Stress Testing
10. UIHC Electrophysiology (EP)
11. Other Rotations

At the end of each learning objective, the letters in parentheses indicate which core competencies are addressed by that specific objective. The letter associated with each core competency is as follows:

- A:** Patient Care
- B:** Medical Knowledge
- C:** Practice-Based Learning and Improvement
- D:** Interpersonal and Communication Skills
- E:** Professionalism
- F:** Systems-Based Practice

VA Outpatient Cardiology

PURPOSE:

This rotation provides exposure to general cardiology in an outpatient setting. The *purpose* of this rotation is to acquire expertise and proficiency in the management of outpatient cardiovascular issues in a patient population with common cardiovascular diseases like coronary artery disease, valvular heart disease, peripheral vascular disease, heart failure, arrhythmias and preoperative evaluation. These problems typically include outpatient evaluation and management of patients with coronary artery disease, congestive heart failure, arrhythmias and preoperative evaluation. Fellows will gain experience in ECG interpretation, performance and interpretation of exercise and pharmacologic stress testing, and performance and interpretation of transthoracic echocardiograms. Fellows will also perform transesophageal echocardiograms and elective cardio versions.

RESPONSIBILITY /SPECIFIC DUTIES:

The fellow has primary responsibility for all patients referred to the service, under the supervision of one faculty member dedicated to this rotation. This rotation also provides the opportunity and time to acquire expertise in nuclear cardiology (half day every afternoon on all weekdays) on studies performed at the VA and basic training in cardiac CT.

When responding to a request for consultation, the trainee is expected to provide comprehensive evaluation of the patient's cardiovascular illness in a prompt and concise manner, formulate a prioritized differential diagnosis, and outline the evaluation. The trainee is expected to document the evaluation and management plan in the patient's electronic medical record. The trainee should communicate the evaluation in a clear and concise manner to the requesting physician and provide adequate follow up. Interactions with colleagues and allied personnel should be conscientious, respectful, responsible, punctual and appropriate. The trainee must exhibit humanistic qualities when interacting with patients and their families and demonstrate integrity, respect and compassion.

Outpatient consultations for patients referred from other services and other VA hospitals are provided Monday, Tuesday, Wednesday, Thursday and Friday mornings each week. Patients are scheduled by the physician assistant's and are seen in the 8E office area. Patients are seen separately by the PA's and the outpatient fellow. The fellow is responsible for personally reviewing all cardiology studies for the patients evaluated in clinic.

The VA outpatient fellow is expected in the VA clinic on 8E at 8am except on those days where there is a morning conference (e.g. Friday 8-9am echo conference and Wednesday 7:30 to 8:30 am cardiology grand rounds/ clinical conference). Fellows are expected to evaluate no more than 5 patients (typically no more than 3 new patients) until 1pm. After 1pm, the VA outpatient rotation is dedicated to non-invasive cardiology. Fellows are expected to participate in the performance and interpretation of nuclear cardiology studies (typically from 2:00pm – 3:30pm), CT coronary angiograms and also review echo studies done in the VA echo lab. Fellows are mandated to maintain a detailed procedure log. The fellow will perform and interpreting GXTs at the VA and following up the abnormal results as appropriate. The VA outpatient fellow is responsible for interpretation of all Holter monitors and will read half of all ECGs for the day. The ECG reading is to be shared with the VA inpatient fellow.

SUPERVISION:

The fellow is expected to discuss all cases with the supervising VA cardiology staff. However, complex cath cases and EP cases maybe directly discussed with cath lab and EP staff. All discussed cases must be documented in the VA electronic chart (CPRS) with the name of the attending physician.

LEARNING OBJECTIVES:

1. Obtain training in the concepts and practice of effective outpatient cardiac consultation. This includes:
 - a. Improving skills for acquiring a detailed and accurate history and physical examination. (A,B)
 - b. Improving skills for insightful review of laboratory data. (A,B)
 - c. Obtain training in review of noninvasive and invasive cardiac tests and incorporation of the test results into the context of the patient's cardiac presentation. (A,B)
 - d. Obtain training in placing the cardiac findings in the patient's overall medical context. (A,B)
 - e. Obtain training in formulation of a broad differential diagnosis with focus on the most likely diagnosis. (A,B)
 - f. Obtain training in formulation of an effective treatment plan. (A,B)
 - g. Gain experience in providing support of the proposed diagnosis and treatment plan by citation of relevant clinical studies and guidelines. (B,C)
 - h. Gain experience in effective communication and interaction with referring physicians. (D,E)
2. Gain exposure to a broad range of cardiac conditions through individual outpatient consultations and supplemental reading. (A,B)
3. Gain training in guideline-based preoperative cardiac risk assessment and effective preoperative risk reduction. (B,C)
4. Obtain training in ECG interpretation. (B)
5. Obtain training in exercise and pharmacologic stress testing performance and interpretation. (B)
6. Obtain training in performing elective cardioversions and in understanding the indications, contraindications, and risks of the procedure. (B)
7. Gain an appreciation for the role of the staff members in the non-invasive labs, including the technicians, nurses, and administrative staff. (D,E,F)

PATIENT CHARACTERISTICS/MIX OF DISEASES/TYPES OF CLINICAL ENCOUNTERS:

At the VAMC, most patients presenting to the non-invasive labs for cardiac procedures and those presenting to the outpatient consult clinic are adult males from a variety of ethnic backgrounds. Fellows will evaluate patients in the outpatient clinic setting and will perform GXTs, and elective cardioversions. Fellows will also evaluate patients pre- and post-procedure. Cardiac conditions encountered will include chronic coronary disease, congestive heart failure, valvular heart disease, and dysrhythmias.

TEACHING METHODS:

Teaching occurs by a variety of methods on this rotation.

1. Direct teaching related to technical skills occurs during the performance of elective cardioversions.
2. The supervising physician will over read fellow interpretation of stress ECGs, and TTEs and offer constructive criticism and further instruction. Attendings will read echos directly with the fellow and provide didactic teaching during the reading sessions.
3. The supervising physician will review the detailed consult notes written by the fellow on all patients seen in clinic. The attending cardiologist provides constructive suggestions for acquisition of additional relevant clinical information, alternate interpretations of the data presented, recommendations for additional diagnostic considerations, and additional treatment considerations. The attending cardiologist reviews the noninvasive and invasive study results performed on the consult patients with the fellow.

EVALUATION:

1. The goals and objectives for the rotation will be verbally communicated at the beginning of the rotation.
2. The fellow's progress will be reviewed verbally at mid-rotation.
3. A standard fellow evaluation form will be completed by the VAMC attending cardiologists who worked with the fellow during the course of the month at the end of the rotation.
4. The final evaluation will be based on the fulfillment of the rotation objectives as determined by:
 - a. Personal observation during interaction with the fellow.
 - b. Evidence of literature review related to individual patients seen in the consult clinic or related to the various procedures performed during the month.
 - c. Evidence of a thorough and accurate patient history and physical examination for each consult patient seen in clinic and evidence of an appropriate directed history and physical examination for each patient referred for procedures requiring pre-procedure evaluation.
 - d. Accuracy in interpretation of invasive and non-invasive tests for the consult patient, with good insight into the role of those test results in arriving at an appropriate differential diagnosis and treatment plan.
 - e. Performance of the fellow in arrival at a broad, appropriate differential diagnosis, with focus on a most likely diagnosis.
 - f. Use of literature and guidelines to develop appropriate treatment plans.
 - g. Improved accuracy in interpretation of ECGs, stress ECGs, and TTEs.
 - h. Progression of technical skills in performing TTEs and TEEs.
 - i. Feedback from the support staff in the non-invasive, ECG lab and nurse managers.

RESOURCES:

University of Iowa Hardin Medical Library (Medline, Up to Date, electronic journals including New England Journal of Medicine, Circulation, Journal of the American College of Cardiology, Journal of the American Medical Association and Medline)

Heart Disease: A Textbook of Cardiovascular Medicine (7th edition) Eugene Braunwald, Editor

www.cardiosource.com

Chou's Electrocardiography in Clinical Practice (5th edition) Surawicz B and Knilans T

Otto's Textbook of Clinical Echocardiography (most recent edition)

Feigenbaum's Echocardiography (most recent edition)

The Echo Manual by Oh et al (most recent edition)

ACC/AHA guideline update for perioperative cardiovascular evaluation for noncardiac surgery. Eagle KA et al. Circulation. 2006 (recent update)

ACCH/AHA guideline update for perioperative atrial fibrillation Circulation 2006 (recent update)
www.acc.org (Scientific statements and Practice Guidelines)

VA Inpatient Cardiology

PURPOSE

The purpose of this rotation is to provide broad exposure to the cardiology fellow to a wide variety of common and rare cardiovascular disorders in the inpatient setting. The fellow has primary responsibility for all patients referred to the service, under the supervision of one faculty member dedicated to this rotation.

The goals and objectives of this rotation are:

- (a) to gain experience in providing cardiology consultation on inpatients, including providing prompt response, assessment of all clinical data (especially ECG monitoring), differential diagnosis, outlined evaluation and interpretation of evaluations, and follow-up of prescribed therapies.
- (b) to work closely with the assigned cardiology staff, which provides opportunity for detailed discussion of treatment plans and demonstration of characteristics and qualities to deliver quality care
- (c) to develop proficiency in inpatient consultative cardiology including pre-operative and peri-operative evaluation
- (d) to develop proficiency in intensive care consultation on critically ill cardiac patients utilizing invasive and non-invasive tests and interventions
- (e) To encourage and develop humanistic care of inpatients.

The structure and purpose of the consult service is similar to the UIHC consult service except that medical students may pursue a cardiology elective rotation and may occasionally participate as members of the cardiology consult team. The VA inpatient fellow is responsible for reviewing all cardiac tests requested on the patients including ECG, Holter monitor, nuclear and echo studies, interrogating pacemakers and reviewing invasive studies such as cardiac catheterization. The cardiology fellow on this rotation serves as a cardiology consultant to patients admitted to the intensive care unit and to other medical and surgical services. The critical care staff physician serves as the primary physician for patients in the intensive care unit at the VA medical center. However, all cardiology consultations are reviewed with the assigned cardiology staff physician whose has the final authority for all recommendations made by the cardiology consult service.

RESPONSIBILITY /SPECIFIC DUTIES:

The VA inpatient fellow is responsible for all inpatient and Urgent Care Clinic cardiology consults between 8:00 am and 5:00 PM Monday through Fridays. If there is an ICU patient on the service or floor patients with active cardiac problems, the fellow should come in on one of the weekend days to round on that patient. Usually, it suffices for the VA inpatient fellow to come in on ONLY one of the weekend days after deciding with the VA staff. The VA fellow is required to take to at least one day of the weekend off every week. The VA inpatient fellow is expected to evaluate any urgent consult as soon as possible. This includes performing a history and physical examination and reviewing all diagnostic test results, laboratory data, and progress notes. The fellow then formulates a differential diagnosis and treatment plan and offers any urgent recommendations immediately. The fellow presents the urgent consultation to the attending cardiologist as soon as is necessary for optimal patient care.

All consultations on patients in the Intensive Care Unit or wards must be reviewed with a staff cardiologist. This interaction should be documented by entering the staff physician's name as the supervising physician and naming the staff as a cosigner on the note. In most cases, patients should be discussed with the designated consultation cardiology staff, but may, at the discretion of the fellow/general cardiology staff physician be discussed with the cardiac catheterization staff, electrophysiology service staff or other cardiology staff with particular expertise depending on the nature of the problem. Daily follow up of inpatients should continue as long as the patient's cardiology problem is active. Daily review of Consult Service patients with the designated staff is expected. Night (5:00 PM to 8:00 AM) hours and weekend coverage of the inpatient service will be provided by the F1 call fellow. Patients that require follow up on the weekend or are unstable should be indicated to the fellow on Division call. Cardiology consultation for VA patients on other services will also be provided by the Fellow (F1) on call after 5pm. The fellow is encouraged to participate in the VA daily ICU rounds (at 8am) conducted by a critical care MICU staff physician. The fellow is expected to be available for all ICU procedures for cardiology patients and those on the neurology team, internal medicine team and, if requested, the surgical team. The fellow may participate in the procedure (including insertion of temporary pacemakers and Swan-Ganz catheters, electrical cardioversions, etc.). The fellow is expected to read half of all VA EKG's daily. Holter monitor is to be read by the VA outpatient fellow. The fellow is expected to meet with the Cardiology staff daily for review of patients and clinical teaching. Requests for inter-hospital patient transfers may be evaluated by the fellow, but acceptance of a patient in transfer must be done only by the Medical Officer of the Day (MOD). Eligibility for VA care should be verified through the admitting MOD and AOD before elective patient transfer. The inpatient fellow maybe requested to assist the outpatient fellow as needed. Concerns regarding VA Cardiology services should be discussed with the chief of cardiology service at the VA and the fellowship program director.

SUPERVISION:

All cardiac consultations are reviewed in detail with the supervising cardiologist with attention to patient and diagnosis-based teaching of the fellow. In addition to clinical review, the attending cardiologist reviews the progress of the fellow in providing appropriate communication and collaboration with the requesting service. This most importantly includes review of the written consultation documented in the chart. The fellow's teaching and learning skills are reviewed on rounds and constructive suggestions are made. The attending cardiologist reviews cardiac invasive and non-invasive tests on cardiac consult patients with the fellow on attending rounds.

LEARNING OBJECTIVES:

1. Obtain training in the concepts and practice of effective inpatient cardiac consultation. This includes:
 - a. Improving skills for acquiring a detailed and accurate history and physical examination. (A,B)
 - b. Improving skills for insightful review of laboratory data. (A,B)
 - c. Obtain training in review of noninvasive and invasive cardiac tests and incorporation of the test results into the context of the patient's cardiac presentation. (A,B)
 - d. Obtain training in placing the cardiac findings in the patient's overall medical context.(A)
 - e. Obtain training in formulation of a broad differential diagnosis with focus on the most likely diagnosis. (A,B)
 - f. Obtain training in formulation of an effective treatment plan. (A,B)

- g. Gain experience in providing support of the proposed diagnosis and treatment plan by citation of relevant clinical studies and guidelines. (B,C)
 - h. Gain experience in effective communication and interaction with referring physicians. (D,E)
2. Obtain training in organizing a consultative service, including effective prioritization based on acuity of patients' clinical problems. (A)
 3. Gain exposure to a broad range of cardiac conditions through individual patient consultations, supplemental reading, and formal didactic presentations on rounds. (A,B)
 4. Gain training in guideline-based preoperative cardiac risk assessment and effective preoperative risk reduction. (A,B,C)
 5. Learn to assist physicians on other services in the management of cardiac emergencies. (D,E,F)

PATIENT CHARACTERISTICS/MIX OF DISEASES/TYPES OF CLINICAL ENCOUNTERS:

On this rotation, fellows will perform inpatient cardiology consultations. Most inpatients at the VAMC are adult males of a variety of ages and ethnicity. A variety of cardiac disorders will be encountered, including coronary artery disease, heart failure, arrhythmias, and valvular heart disease, preoperative and peri-operative consultation.

TEACHING METHODS:

Teaching by the attending cardiologist occurs daily on attending rounds and is supplemented as needed for urgent consultations. The attending physician reviews the detailed consult presentations prepared by the fellow. The attending cardiologist provides constructive suggestions for acquisition of additional relevant clinical information, alternate interpretations of the data presented, recommendations for additional diagnostic considerations, and additional treatment considerations. The attending cardiologist reviews noninvasive and invasive studies with the fellow, including ECGs. The attending cardiologist provides bedside teaching of clinical history and cardiac examination skills.

EVALUATION:

1. The goals and objectives for the rotation will be verbally communicated at the beginning of the rotation.
2. The fellow's progress will be reviewed verbally at mid-rotation.
3. A standard electronic fellow evaluation form will be completed by the attending cardiologist at the end of the rotation.
4. The attending cardiologist's final evaluation will be based on the fulfillment of the rotation objectives as determined by:
 - a. Personal observation during interaction with the fellow.
 - b. Evidence of literature review related to the individual consult patient.
 - c. Evidence of a thorough and accurate patient history and physical examination for each consult.
 - d. Accuracy in interpretation of invasive and non-invasive tests for the consult patient, with good insight into the role of those test results in arriving at an appropriate differential diagnosis and treatment plan.
 - e. Performance of the fellow in arrival at a broad, appropriate differential diagnosis, with focus on a most likely diagnosis.
 - f. Use of literature and guidelines to develop appropriate treatment plans.
 - g. Improved accuracy in interpretation of electrocardiograms.

- h. Evidence of effective written and oral communication with referring physicians.
- i. Evidence of effective patient follow-up following initial consultation.
- j. Feedback from other consult team members and referring physicians.

RESOURCES:

University of Iowa Hardin Medical Library (Medline, Up to Date, electronic journals including New England Journal of Medicine, Circulation, Journal of the American College of Cardiology, Journal of the American Medical Association and Medline)

www.cardiosource.com

Heart Disease: A Textbook of Cardiovascular Medicine (7th edition) Eugene Braunwald, editor

PURPOSE:

The purpose of the rotation is to gain an understanding of coronary anatomy and hemodynamics and to acquire the technical, cognitive and motor skills required to gain venous and arterial access and to perform coronary angiography.

The trainee will develop and be expected to demonstrate expertise in the following aspects related to the procedure including:

- (a) Understanding the appropriateness of procedure. The trainee should understand the indications for right and left heart catheterization, right ventricular endocardial biopsy, and be able to estimate the risk and benefit of procedures performed. Knowledge of comorbid factors that increase the risk of a procedure should be demonstrated.
- (b) Obtaining informed consent. The trainees should communicate the risk and benefits of a procedure in a manner that is understood by the patient and address questions raised by the patient. In situations where the patient cannot give informed consent, the trainee should obtain consent from appropriate sources.
- (c) Administering anesthesia. The trainee should demonstrate knowledge of the pharmacology of medications used for conscious sedation, contraindications for their use, side effects, and the treatment of side effects. The trainee should develop the skills to make the patient comfortable during an examination, follow the degree of sedation, and recognize and treat complications. The trainee should develop skills in obtaining vascular access to the internal jugular, subclavian and femoral veins as well as the femoral artery and brachial artery.
- (d) Coronary angiography and ventriculography. The trainee should develop skill in the injection of contrast material for angiography; recognize the potential complications of the use of x-ray contrast material. The trainee should develop a high level of competence in the interpretation of hemodynamic data and angiographic data.
- (e) Pericardiocentesis. The trainee should be able to understand the indications and potential risks of cardiac pericardiocentesis. He should demonstrate skill in performing the procedure.
- (f) Evaluating and treating complications. The trainee should have full knowledge of the potential complications of the procedures of diagnostic catheterization, the mechanisms for monitoring complications when suspected, and full knowledge of the appropriate treatment of these complications.
- (g) Right ventricular endocardial biopsy. The trainee should have full understanding of the indications for diagnostic endocardial biopsy and should have skill in performing this procedure both from the internal jugular and femoral venous approach. The trainee should have understanding of the potential complications and be prepared for emergent pericardiocentesis should complications arise.

RESPONSIBILITY/SPECIFIC DUTIES:

During the first two years of training the fellow will aim to acquire the cognitive and motor skills to perform left and right heart catheterization. A minimum of six months is dedicated to this area, four at UIHC and two at the VA. In addition, during the two months of inpatient CVICU rotations, the CVICU fellow will participate in invasive procedures on patients admitted or transferred to the CVICU. All procedures are performed under the direct supervision of an attending. The fellow is also expected to learn the indications for coronary intervention and post-intervention management. Fellows with an interest in interventional cardiology will be offered advanced training in this field. Overall, the cardiac catheterization laboratory experience will prepare most fellows for level 2 certification (8 months cardiac catheterization laboratory experience and at least 300 invasive diagnostic procedures)

Duties and responsibilities include the following:

1. The fellow will evaluate all outpatients referred for cardiac catheterization. The fellow will see all inpatients referred for cardiac catheterization on the ward or unit to which the patient is admitted.
2. The fellow will evaluate each patient prior to performing any invasive procedure. This evaluation will include reviewing all pertinent paperwork (H&P, labs, non-invasive studies, etc), perform a focused physical exam, ensure informed consent properly obtained, and answer any questions from the patient or family members.
3. The fellow will discuss cases with the cath lab attending
4. The fellow will arrive at least 30 minutes before the first scheduled case in order to greet the first patient and review any outstanding lab data or answer any last minute questions.
5. The fellow will perform all cath lab procedures under the supervision of the cath lab attending physician
6. The fellow will complete the post-procedure paperwork (post-cath orders, brief note for chart, dictate the formal cath report, etc).
7. The fellow will call the house staff with results and to discuss any pertinent management issues and will inform the appropriate inpatient or outpatient cardiology fellow or physician assistant of any complication or complicated management issues.
8. The fellow will see all outpatients in the Cath Lab recovery area prior to discharge to perform a post-procedure groin check, review results, and answer any questions. Post-cath inpatients must be seen by the end of the procedure day for a post-procedure groin check.
9. The fellow will prepare a case for presentation at the weekly Cath Conference.
10. The fellow may assist the interventional staff with PCI cases if needed.
11. The fellow will maintain a complete and accurate log of all procedures performed.
12. The fellow will screen all outpatient referrals for cardiac catheterization and enter orders for the procedure if appropriate.

SUPERVISION:

The fellow will review all cases with the cath lab attending prior to performing any procedure. All invasive cardiac procedures will be performed under the direct supervision of an invasive or interventional attending cardiologist.

LEARNING OBJECTIVES:

1. Learn the indications and contraindications of cath lab procedures. (B)
2. Learn to recognize and treat immediate cath lab complications. (A,B)
3. Become proficient in the technical aspects of coronary and peripheral angiography, right and left heart catheterization, pericardiocentesis, and temporary pacemaker placement. (B)
4. Learn the indications for and gain exposure to coronary PTCA and stenting. (B)
5. Learn and understand the protocols for correct performance and interpretation of invasive hemodynamic studies, including dobutamine valve studies, intracardiac shunt assessment, pericardial tamponade, and restrictive versus constrictive physiology. (B)
6. Learn proper radiation safety. (B)
7. Develop an academic approach to the proper utilization of invasive cardiac testing. (A,B,C)
8. Gain an appreciation for the role of the Cath Lab staff members, including the technicians, nurses, and administrative staff. (D,E,F)
9. Progress toward the specific training requirements for the desired level of certification as outlined by COCATS 2. (B)
 - a. It is important to emphasize that the actual number of procedures required to accomplish clinical competence in cardiac catheterization is somewhat arbitrary, because there is individual variation in cognitive, analytical, and manual-dexterity skills. The listed numbers are therefore the minimum requirements anticipated to properly train the average cardiology fellow, and individual fellows may be required to perform additional procedures as determined by the Cath Lab supervising physician.
 - b. Minimum training standards for cardiac catheterization are as follows:

COCATS Training Requirements for Diagnostic Cardiac Catheterization

Training Level	Cumulative Duration	Cumulative Number of Cases Performed
I	4	100
II	8	300

PATIENT CHARACTERISTICS/MIX OF DISEASES/TYPES OF CLINICAL ENCOUNTERS:

At the VAMC, the patient population that presents for cath lab procedures consists mostly of adult males from various ethnic and socioeconomic backgrounds. Patients presenting to the Cath Lab for procedures have a variety of cardiac disorders, including coronary artery disease, valvular heart disease, congestive heart failure, and pericardial disease. Clinical encounters include pre-procedure evaluations in the ambulatory surgery unit and on the inpatient wards, performing the requested procedure, and providing any immediate post-procedure follow-up. Procedures performed include left and right heart catheterization, coronary and peripheral angiography, percutaneous peripheral and coronary intervention, pericardiocentesis, and temporary pacemaker placement.

TEACHING METHODS:

The fellow will review each patient's history and planned procedure with the attending. The attending will supervise the fellow during the procedure, and the fellow will assume progressive levels of responsibility as his or her skill level improves. The attending will review all procedure data with the fellow after the procedure is completed.

EVALUATION:

1. The goals and objectives for the rotation will be verbally communicated at the beginning of the rotation.
2. The fellow's progress will be reviewed verbally mid-rotation.
3. A standard fellow evaluation form will be completed by the attending at the end of the rotation.
4. The final evaluation by the supervising physician will be based on the fulfillment of the rotation objectives as determined by:
 - a. Personal observation during interaction with the fellow while performing Cath Lab procedures.
 - b. Evidence of literature reviews appropriate for the individual patient and topic.
 - c. Evidence of ability to perform appropriate pre-procedure evaluation.
 - d. Evidence of ability to properly select patients for testing.
 - e. Competent performance of cardiac procedures relative to the fellow's level of training.
 - f. Correct interpretation of procedure data obtained.
 - g. Evidence of ability to provide appropriate post-procedure care.
 - h. Feedback from Cath Lab staff members, other healthcare providers, and patients.

RESOURCES:

University of Iowa Hardin Medical Library (Medline, Up to Date, electronic journals including New England Journal of Medicine, Circulation, Journal of the American College of Cardiology, Journal of the American Medical Association and Medline)

Heart Disease: A Textbook of Cardiovascular Medicine (7th edition) Eugene Braunwald, editor

www.cardiosource.com

Baim and Grossman's Cardiac Catheterization, Angiography, and Intervention (most recent edition)

Kern's The Cardiac Catheterization Handbook (most recent edition)

PURPOSE:

This rotation provides broad exposure to a wide variety of clinical disorders in cardiology. The purpose of this rotation is to expose the fellow to cardiology problems encountered in a tertiary care hospital, which includes complex cardiology problems on the medical services, as well as exposure to the cardiology problems which may arise in surgical, gynecologic, psychiatric, neurologic patients and cardiac illnesses in pregnancy. The fellow is expected to develop expertise in preoperative evaluation and perioperative cardiac management. Consultative services are provided for all clinical services at UIHC with the exception of pediatrics. The fellow has primary responsibility for all patients referred to the service, under the supervision of the faculty. When a medical resident or residents are assigned to this service, the resident assists the fellow and will be primarily responsible for a subgroup of patients on the service. The fellow will supervise the medical resident in this capacity, and reports directly to the attending. The attending will make rounds daily with all members of the consult team (fellow, medical residents, and students). Thus, during this rotation, the cardiology fellow is expected to acquire skills related to the clinical management of complex cardiology problems, as well as develop supervisory and teaching skills in the context of working with medical residents or students. It is further expected that the fellow's skills will progress over time and during subsequent rotations on this service.

RESPONSIBILITIES/SPECIFIC DUTIES:

The fellow is expected to be involved with all patients on the UIHC Inpatient Consult Service; chest pain center patients admitted by the ER physicians and add on same day outpatient consults to be seen in the UIHC Heart Care Clinic. The fellow will see consults with the residents and medical students on the team and discuss patients with the consult attending physician.

For non-urgent consultations, the fellow assigns the initial consult workup to a resident or student on the UIHC Consult Service. The fellow then reviews the initial consultation workup with the resident or student, takes a focused history and physical examination, reviews all diagnostic tests, laboratory data, and progress notes, and assists, if needed, in the presentation of the consult patient to the attending cardiologist on daily rounds.

The fellow performs the evaluation of patients for whom the consult is urgent. This includes a history and physical examination, review of diagnostic test results, laboratory data, and progress notes. The fellow formulates a differential diagnosis and treatment plan. The fellow presents the urgent consultation to the attending cardiologist as soon as possible, or if appropriate, on daily consultation rounds.

The fellow assists with teaching for residents and students on the UIHC Consult Service. This typically consists of providing information related to individual consult patients and participation in teaching on daily attending rounds. In addition, the fellow participates in the presentation of didactic core cardiology topics that are required for the residents and students on the UIHC Consult Service.

In general, the fellow will alternate with the resident in terms of initial evaluation of all consults. When the resident is unavailable (e.g. in clinic), the fellow will evaluate all consult patients. In general, all consults will be seen and staffed on the same day the consult is called.

The fellow is expected to interpret and sign all EKG's in the UIHC Consult box daily. These EKG's are located in the EKG lab and are to be completed by 10:00 am. UIHC consult fellow and staff physician provides consultation for Emergency Room chest pain unit. These patients are staffed with the UIHC consult staff. Usually, patients admitted to the CP unit need not be examined the same night if you are called after 10pm unless the ER physicians specifically request a consultation. These patients are to be seen early next morning. Weekend CP patients treadmill coverage is provided by CHAMPS (cardiac rehabilitation service).

In addition, the cardiology clinic (UI heart care center) has a couple of slots for patients seen in other clinics that need to be evaluated the same day usually for perioperative evaluation. These patients are evaluated by the UIHC consult fellow and presented to the consult service staff physician.

The Consult Fellow must communicate with the F1 fellow on call the previous night to determine if there are any pending consults or patients requiring immediate follow-up. Similarly, the Consult Fellow must call the F1 fellow taking call after 5pm and review any critically ill patients that may require follow up consultation over night. Weekend cardiology consult coverage is provided by the on-call cardiology fellow. The staff physician coverage for the UIHC consult service on the weekend alternates between the cardiology inpatient service staff and the VA cardiology staff physician.

SUPERVISION:

1. All cardiac consultations are reviewed in detail with the attending cardiologist with attention to patient- and diagnosis-based teaching of the fellow.
2. In addition to clinical review, the attending cardiologist reviews the progress of the fellow in providing appropriate communication and collaboration with the requesting service.
3. The attending cardiologist provides teaching of electrocardiographic interpretation.
4. The fellow's teaching and learning skills are reviewed on rounds and constructive suggestions are made.
5. The attending cardiologist reviews cardiac invasive and non-invasive tests on cardiac consult patients with the fellow and other team members on attending rounds.

LEARNING OBJECTIVES:

1. Obtain training in the concepts and practice of effective cardiac consultation. This includes:
 - a. Improving skills for acquiring a detailed and accurate history and physical examination. (A,B)
 - b. Improving skills for insightful review of laboratory data. (A,B)
 - c. Obtain training in review of noninvasive and invasive cardiac tests and incorporation of the test results into the context of the patient's cardiac presentation. (A,B)
 - d. Obtain training in placing the cardiac findings in the patient's overall medical context. (A,B)
 - e. Obtain training in formulation of a broad differential diagnosis with focus on the most likely diagnosis. (A,B)

- f. Obtain training in formulation of an effective treatment plan. (A,B)
 - g. Gain experience in providing support of the proposed diagnosis and treatment plan by citation of relevant clinical studies and guidelines. (B,C)
 - h. Gain experience in effective communication and interaction with referring physicians. (D,E,F)
2. Obtain training in electrocardiographic interpretation. (B)
 3. Obtain training in organizing a consultative service, including effective prioritization based on acuity of patients' clinical problems. (A,B,C)
 4. Gain exposure to a broad range of cardiac conditions through individual patient consultations, supplemental reading, and formal didactic presentations on rounds. (A,B)
 5. Gain training in guideline-based preoperative cardiac risk assessment and effective preoperative risk reduction. (B,C)
 6. Learn to assist physicians on other services in the management of cardiac emergencies. (D,E,F)
 7. Gain experience in proper coding and billing. (E,F)

PATIENT CHARACTERISTICS/MIX OF DISEASES/TYPES OF CLINICAL ENCOUNTERS:

Training occurs at University Hospital. The patient population includes men and women of all adult ages and of varied ethnic and socioeconomic background. The population includes patients from a primary care base and tertiary referral patients and emergency room patients. Special populations include patients with transplanted organs, acute and chronic neurologic disease, surgical patients, and patients in intensive care units. Clinical encounters consist of inpatient cardiac consultations. Consultations often are for diagnosis and management of chest pain, unexplained dyspnea, dysrhythmias or syncope, and for preoperative cardiac risk evaluation or perioperative cardiac management. Initial consultation and inpatient follow-up are included.

TEACHING METHODS:

Teaching by the attending cardiologist occurs daily on attending rounds and is supplemented as needed for urgent consultations. The attending physician reviews the detailed consult presentations prepared by the fellow, as well as the presentations by residents or students that have been directed by the fellow. The attending cardiologist provides constructive suggestions for acquisition of additional relevant clinical information, alternate interpretations of the data presented, recommendations for additional diagnostic considerations, and additional treatment considerations. The attending cardiologist reviews noninvasive and invasive studies with the fellow. The attending physician reviews electrocardiograms interpreted by the fellow and provides appropriate feedback for the accurate interpretation of ECG. The attending cardiologist provides bedside teaching of clinical history and cardiac examination skills. In addition to didactic teaching on rounds, the attending cardiologist may assign didactic talks to the house staff and students to assure that a broad range of cardiac topics are reviewed during the course of the rotation.

EVALUATION:

1. The goals and objectives for the rotation will be verbally communicated at the beginning of the rotation.
2. The fellow's progress will be reviewed verbally at mid-rotation.
3. A standard electronic fellow evaluation form will be completed by the attending cardiologist at the end of the rotation.

4. The attending cardiologist's final evaluation will be based on the fulfillment of the rotation objectives as determined by:
 - a. Personal observation during interaction with the fellow.
 - b. Evidence of literature review related to the individual consult patient.
 - c. Evidence of a thorough and accurate patient history and physical examination for each consult.
 - d. Accuracy in interpretation of invasive and non-invasive tests for the consult patient, with good insight into the role of those test results in arriving at an appropriate differential diagnosis and treatment plan.
 - e. Performance of the fellow in arrival at a broad, appropriate differential diagnosis, with focus on a most likely diagnosis.
 - f. Use of literature and guidelines to develop appropriate treatment plans.
 - g. Improved accuracy in interpretation of electrocardiograms.
 - h. Evidence of effective written and oral communication with referring physicians.
 - i. Evidence of effective teaching of residents and students.
 - j. Evidence of effective patient follow-up following initial consultation.
 - k. Feedback from other consult team members and referring physicians.

RESOURCES:

University of Iowa Hardin Medical Library (Medline, Up to Date, electronic journals including New England Journal of Medicine, Circulation, Journal of the American College of Cardiology, Journal of the American Medical Association and Medline)

Chou's Electrocardiography in Clinical Practice (5th edition) Surawicz B and Knilans T

Heart Disease: A Textbook of Cardiovascular Medicine (7th edition) Eugene Braunwald, editor

ACC/AHA/ESC 2006 Guidelines for the Management of Patients With Atrial Fibrillation—Executive Summary (Circulation. 2006; 114:700-752.)

ACC/AHA 2006 Guideline Update on Perioperative Cardiovascular Evaluation for Noncardiac Surgery: Focused Update on Perioperative Beta-Blocker Therapy;
JACC Vol. 47, 2006

www.cardiosource.com

PURPOSE:

The overall purpose of the CVICU rotation is to provide trainees with a comprehensive training experience in the evaluation and management of common cardiac disorders as well as training experience in evaluation and management of other life threatening illnesses that may present with cardiovascular manifestation. This intensive training experience is designed to expose the trainee to both acute presentations of cardiac dysfunction and ensure that the fellow acquires the necessary clinical and procedural skills to care for cardiac disorders routinely encountered in the practice of cardiology.

Each cardiology fellow will rotate on the CVICU service for two months during the course of their fellowship. On this rotation, the fellow will learn how to evaluate and manage patients with acute coronary syndromes, including cardiac arrest and cardiogenic shock, cardiac dysrhythmias, congestive heart failure, valvular heart disease, myocardial and pericardial heart disease, and aortic and hypertensive emergencies.

Fellows will be introduced to and become proficient in the performance and interpretation of a number of cardiac procedures including, but not limited to, pulmonary artery catheter placement, temporary venous pacemaker insertion, intra-aortic balloon pumps management, and elective cardioversion. Review and integration of laboratory, radiographic, hemodynamic, and cardiac diagnostic studies will be emphasized during this clinical rotation. During this rotation the development of a strong mentoring relationship with clinical faculty is developed and emphasizes leadership skills for managing a healthcare team

RESPONSIBILITY/SPECIFIC DUTIES:

In the CVICU, medical residents are primarily responsible for all patients. The fellow is responsible for supervising the house-staff teams assigned to the CVICU and assists in the management of the CVICU patients. The fellow is responsible for those patients admitted to the CVICU who are admitted under the care of the cardiology faculty physician. The CVICU fellow will coordinate management of such patients under the direction of that faculty member. A dedicated CVICU attending physician will oversee all aspects of the fellow's duties; will make twice daily rounds with the fellow. Teaching rounds are held daily with all members of the CVICU team. The fellow will pre-round on any critically ill patients and discuss significant patient management issues from overnight with the post-call team. The fellow will actively assist the house staff with management of critically ill patients and will be readily available to answer any questions regarding patient management throughout the day. The fellow, together with the attending, will be jointly responsible for core curriculum teaching as required for the education of the house staff. This will include didactic lectures as well as daily teaching on patient care related issues. The fellow will supervise the performance of all invasive procedures performed by house staff on cardiology inpatients in the CVICU. Weeknight and weekend call responsibilities are outlined in the section on CALL. All critically ill patients and any issues that need follow-up overnight will be checked out in a detailed manner to the on-call fellow. It is the responsibility of the CVICU to be intimately involved in the management of the CVICU patients. The CVICU fellow should be aware at all times of the status and treatment plan of these patients. The CVICU fellow should also be aware of the status and plan for the CHF/TXP service patients, although most of the fellow responsibilities for these patients will fall to the CHF/TXP fellow.

SUPERVISION:

The attending physician, fellow, and house staff will provide a team-based, patient-centered approach toward patient care and teaching as it relates to the etiology, pathogenesis, clinical presentation, natural history, and treatment of the various general cardiac disorders seen on this service. The fellow will be responsible for the day to day management of the CVICU as set forth during daily morning rounds. The attending will review the fellow's presentation, review and constructively critique the fellow's plan of care, confirm the fellow's physical exam findings, and review and confirm the fellow's notes. As appropriate, the attending will review and supplement the fellow's teaching of the other members of the team. The attending may assign readings or other learning activities as necessary. The attending will supervise the fellow during invasive procedures based on the level of the fellow's skills.

LEARNING OBJECTIVES:

1. Obtain comprehensive training in inpatient management of cardiac disorders including: acute myocardial infarction and acute coronary syndromes, cardiac dysrhythmias including all forms of conduction block, acute and chronic congestive heart failure, valvular heart disease, myocardial and pericardial disease, and adult congenital cardiac disease. Additionally, acute aortic syndromes, hypertensive emergencies, pulmonary hypertension, peripheral and extracranial cerebrovascular disease are commonly managed on this service. (A,B)
2. Evaluate patients in the CVICU who may have cardiac disorders by taking a thorough problem-directed history, performing a careful physical examination, and generating a differential diagnosis and plan of care. (A,B,F)
3. Gain basic understanding of the indications, use limitations, and complications of cardiac diagnostic studies. (A,B)
4. Gain basic training and experience in the use of pharmacologic and non-pharmacologic options for treating acute and chronic coronary ischemic syndromes, CHF, dysrhythmias, cardiogenic shock, valvular heart disease, adult congenital heart disease, peripheral vascular disease, and extracranial cerebrovascular disease. (A,B)
5. Understand the indications, risks, and benefits of thrombolytic therapy, diagnostic cardiac catheterization, PCI, CABG, valve surgery, percutaneous valvuloplasty, cardiac pacemakers, ICDs, resynchronization devices, IABPs, pulmonary artery catheters, elective cardioversion, PFO/ASD closure, peripheral vascular stenting, and carotid stenting. (A,B)
6. Learn when to request appropriate cardiology subspecialty, vascular surgery, and cardiothoracic surgery consultation. (B,F)
7. Learn to recognize and manage cardiac emergencies. (A,B)
8. Explain the etiology, pathogenesis, clinical presentation, and natural history of major cardiac disorders including MI, CHF, atrial and ventricular dysrhythmias and heart block, hypertensive emergencies, acute aortic emergencies, and acute and chronic myocardial and pericardial disease states. (A,B)
9. Practice integrative, patient-centered, team-based medical care, incorporating evidenced based therapies and "best practices," as outlined by ACC and AHA practice guidelines. (A,B,C,F)
10. Review all cardiac studies directly related to patient care activities to increase learning opportunities and enhance clinical and integrative skill sets. (A,B)
11. Gain an appreciation for the role of the ancillary staff members, including the nurses, clerical staff, lab and x-ray technicians, pharmacy staff, social workers, and chaplains. (D,E,F)

PATIENT CHARACTERISTICS/MIX OF DISEASES/TYPES OF CLINICAL ENCOUNTERS:

Training occurs at the UIHC and provides a wide range of pathology and a diverse patient population. Both men of women of all adult ages and of various ethnic backgrounds are seen. Clinical encounters are primarily centered on evaluations of critically ill patients in the emergency room, other inpatient units and patient transferred from community hospitals to the CVICU. Performance of invasive procedures is common and includes hemodynamic monitoring catheters (pulmonary artery catheters, arterial lines, and central venous lines), intra-aortic balloon pumps, temporary venous pacemakers, elective and emergent cardioversions, and intubations.

TEACHING METHODS:

The attending will review the fellow's presentation, review and constructively critique the fellow's plan of care, confirm the fellow's physical exam findings, review and confirm the fellow's notes, and review and supplement the fellow's teaching of other members of the team. The attending may assign readings or other learning activities. The attending will supervise the fellow in the performance of procedures. The fellow will assume progressive levels of responsibility for patient care and procedure performance under the supervision of the attending.

EVALUATION:

1. The goals and objectives for the rotation will be verbally communicated at the beginning of the rotation.
2. The fellow's progress will be reviewed verbally mid-rotation.
3. A standard fellow evaluation form will be completed by the supervising physician at the end of the rotation.
4. The final evaluation will be based on the fulfillment of the rotation objectives as determined by:
 - a. Personal observation during interaction with the fellow.
 - b. Evidence of extensive literature reviews appropriate for the individual patient and topic.
 - c. Ability to construct a logical management plan.
 - d. Inclusion of appropriate physical examination.
 - e. Appropriateness of use of diagnostic tests.
 - f. Correct interpretation of diagnostic tests.
 - g. Appropriate selection of pharmacologic and non-pharmacologic therapies.
 - h. Competent performance of cardiac procedures relative to the fellow's level of training.
 - i. Appropriate follow-up.
 - j. Feedback from other team members, other healthcare providers, and patients.

RESOURCES:

University of Iowa Hardin Medical Library (Medline, Up to Date, electronic journals including New England Journal of Medicine, Circulation, Journal of the American College of Cardiology, Journal of the American Medical Association and Medline)

www.cardiosource.com

Heart Disease: A Textbook of Cardiovascular Medicine (7th edition) Eugene Braunwald, editor

UIHC Cardiomyopathy, Heart Failure, & Transplantation

PURPOSE:

The overall purpose of the Cardiomyopathy, Heart Failure and Transplant rotation is to provide trainees with extensive experience in the diagnosis and management of patients with acute and chronic congestive heart failure and to provide an introductory experience to cardiac transplantation.

Each cardiology fellow will rotate on this service for 2 months during the course of their fellowship. On this rotation, the fellow will learn how to evaluate and manage patients with heart failure related disorders in both the inpatient and outpatient setting. The fellow will also be introduced to the performance of common procedures performed on heart failure and cardiac transplant patients, such as right heart catheterization and RV biopsy.

RESPONSIBILITY/SPECIFIC DUTIES:

The overall duties and responsibilities on this rotation include:

- (1) Primary: Manage a busy inpatient care team under the supervision of the cardiomyopathy, transplant faculty; complete inpatient consultations with faculty oversight and teach medical students and residents on the clinical rotation.
- (2) Secondary: Perform central line placement, pulmonary artery catheterization, vasodilator challenge, and endomyocardial biopsy; manage heart failure and pulmonary hypertension in an outpatient clinic setting; participate in clinical trial enrollment and subject treatment; participate in review of cardiac biopsies; supervise and interpret Cardiopulmonary Exercise Tests and again gain familiarity with ultrafiltration.

Training will include predominantly in the inpatient setting on the inpatient heart failure/transplant service. Fellows will also perform outpatient invasive procedures and evaluate patients in the heart failure clinic under the direct supervision of the attending on the heart failure/transplant service.

The fellow is the point of contact for the Congestive Heart Failure/Transplant service at UIHC Monday through Friday from 8 am to 5 pm and on every other weekend. The CHF/TXP fellow will be the primary fellow responsible for the management of all CHF/TXP patients admitted to the CCU service. On weekends, the CHF/TXP patients are seen by the cardiology fellow on service and on every other weekend by the CVICU fellow. The fellow receives and reviews all Congestive Heart Failure/Transplant inpatients in the ICU and on the inpatient service (non intensive care unit) from other services, performs the initial evaluation, reviews all pertinent laboratory data and related test results, develops an initial management strategy, presents the patient to the Congestive Heart Failure/Transplant attending, The fellow will work closely with the Internal Medicine residents or others involved in the care of CHF/TXP patients. The fellow will teach and supervise these team members and assist them in patient presentation. The fellow will conduct daily rounds on all Congestive Heart Failure/Transplant inpatients and will review each patient with the Congestive Heart Failure/Transplant attending physician during the morning rounds.

The fellow will attend Congestive Heart Failure/Transplant Meetings. The fellow will assist the Congestive Heart Failure/Transplant attending during procedures performed in the Cath Lab or on the wards and will progress to higher levels of participation as the fellow's skill level allows. Fellows will participate in cardio-pulmonary exercise testing and receive training to develop expertise in physical rehabilitation for patients with heart failure. The fellow will communicate the patient's study information to the house staff post-procedure, write a procedure note, and do the appropriate post-procedure checks (x-ray, operative site, labs, etc).

SUPERVISION:

The staff physician and fellow will care for patients as a team to facilitate patient care and teaching as it relates to the etiology, pathogenesis, clinical presentation, natural history, and the treatments of the various Congestive Heart Failure/Transplant disorders seen. The attending will review the fellow's presentation, review and constructively critique the fellow's plan of care, confirm the fellow's physical exam findings, and review and supplement the fellow's teaching of other members of the team. The attending may assign readings or other learning activities as necessary. The attending will supervise the fellow during invasive procedures based on the level of the fellow's skills.

OBJECTIVES:

The objectives of this rotation are as follows:

- 1) Learn to diagnose and treat acute, decompensated heart failure and cardiogenic shock; chronic heart failure decompensation in patients with both systolic and diastolic heart failure; decompensated pulmonary hypertension; common complications of heart transplantation; common complications of ventricular assist device insertion (A,B)
- 2) Understand the indications and contraindications for the following advanced heart failure and pulmonary hypertension therapies including biventricular pacing; cardiac transplantation; Ventricular assist device implantation; pulmonary vasodilators; lung and heart-lung transplantation (A,B)
- 3) Improve general inpatient management skills in critical care, telemetry, and consultation settings by developing critical thinking and clinical analysis; developing a comprehensive approach to diagnosis; practicing evidenced based medicine and to develop procedural skills in right heart catheterizations, placement of central venous lines and peripheral arterial lines. (A,B, F)
- 4) Learn to appreciate and use a multidisciplinary team in the treatment of cardiomyopathy and pulmonary hypertension by overseeing residents and work with an integrated care team of doctors, nurses (team and floor), nurse practitioners, nutritionists, social workers, pharmacists (A, D, E,F)
- 5) Learn common outpatient management strategies and treatment guidelines for heart failure and pulmonary hypertension (A,B)
- 6) Become knowledgeable of and participate in clinical trials (A,B,C)
- 7) Understand the salient features of allograft rejection, myocarditis, infection, and other pathology on cardiac biopsies (A,B)
- 8) Develop teaching skills via didactic and clinical opportunities with residents and students by encourage critical thinking and clinical analysis; encouraging a comprehensive approach to diagnosis and encouraging evidenced based thinking (C,D,E,F)
- 9) Fellows who desire additional training in management of cardiomyopathy and cardiac transplantation may spend an additional year to acquire the necessary clinical skill and develop investigative research skills (A,B)

- 10) Become familiar with the current medical literature as it relates to CHF and cardiac transplantation to help facilitate the practice of evidence-based management of CHF and post-transplant patients. (C)

PATIENT CHARACTERISTICS/MIX OF DISEASES/TYPES OF CLINICAL ENCOUNTERS:

Training occurs at UIHC and provides experience in a wide range of cardiac pathology in a diverse patient population. Both men and women of all adult ages and of various ethnic backgrounds are seen. Clinical encounters include predominantly inpatient consultation, outpatient consultation in the heart failure clinic, and peri-procedural care. Both non-invasive and invasive procedures are performed, including the interpretation of ECGs, cardiopulmonary stress testing, right heart catheterization, and RV biopsy.

TEACHING METHODS:

The supervising physician will review the fellow's presentation, review and constructively critique the fellow's plan of care, confirm the fellow's physical exam findings, review and supplement the fellow's teaching of other members of the team. The attending physician may assign readings or other learning activities. The attending will supervise the fellow in the performance of procedures. The fellow will assume progressive levels of responsibility for patient care and procedure performance under the supervision of the attending.

EVALUATION:

1. The goals and objectives for the rotation will be verbally communicated at the beginning of the rotation.
2. The fellow's progress will be reviewed verbally mid-rotation.
3. A standard fellow evaluation form will be completed by the attending at the end of the rotation.
4. The final evaluation by the supervising physician will be based on the fulfillment of the rotation objectives as determined by:
 - a. Personal observation during interaction with the fellow.
 - b. Evidence of extensive literature reviews appropriate for the individual patient and topic.
 - c. Ability to construct a logical management plan.
 - d. Inclusion of appropriate physical examination.
 - e. Appropriateness of use of diagnostic tests.
 - f. Correct interpretation of diagnostic tests.
 - g. Appropriate selection of pharmacologic and non-pharmacologic therapies.
 - h. Competent performance of cardiac procedures relative to the fellow's level of training.
 - i. Appropriate follow-up.
 - j. Feedback from other team members, other healthcare providers, and patients.

RESOURCES:

University of Iowa Hardin Medical Library (Medline, Up to Date, electronic journals including New England Journal of Medicine, Circulation, Journal of the American College of Cardiology, Journal of the American Medical Association and Medline)

www.cardiosource.com

Heart Disease: A Textbook of Cardiovascular Medicine (7th edition) Eugene Braunwald, editor

www.hfsa.org

UIHC Cardiac Catheterization Laboratory

PURPOSE:

The purpose of the rotation is to gain an understanding of coronary anatomy and hemodynamics and to acquire the technical, cognitive and motor skills required to gain venous and arterial access and to perform coronary angiography.

The trainee will develop and be expected to demonstrate expertise in the following aspects related to the procedure including:

- (a) Understanding the appropriateness of procedure. The trainee should understand the indications for right and left heart catheterization, right ventricular endocardial biopsy, and be able to estimate the risk and benefit of procedures performed. Knowledge of comorbid factors that increase the risk of a procedure should be demonstrated.
- (b) Obtaining informed consent. The trainees should communicate the risk and benefits of a procedure in a manner that is understood by the patient and address questions raised by the patient. In situations where the patient cannot give informed consent, the trainee should obtain consent from appropriate sources.
- (c) Administering anesthesia. The trainee should demonstrate knowledge of the pharmacology of medications used for conscious sedation, contraindications for their use, side effects, and the treatment of side effects. The trainee should develop the skills to make the patient comfortable during an examination, follow the degree of sedation, and recognize and treat complications. The trainee should develop skills in obtaining vascular access to the internal jugular, subclavian and femoral veins as well as the femoral artery and brachial artery.
- (d) Coronary angiography and ventriculography. The trainee should develop skill in the injection of contrast material for angiography; recognize the potential complications of the use of x-ray contrast material. The trainee should develop a high level of competence in the interpretation of hemodynamic data and angiographic data.
- (e) Pericardiocentesis. The trainee should be able to understand the indications and potential risks of cardiac pericardiocentesis. He should demonstrate skill in performing the procedure.
- (f) Evaluating and treating complications. The trainee should have full knowledge of the potential complications of the procedures of diagnostic catheterization, the mechanisms for monitoring complications when suspected, and full knowledge of the appropriate treatment of these complications.
- (g) Right ventricular endocardial biopsy. The trainee should have full understanding of the indications for diagnostic endocardial biopsy and should have skill in performing this procedure both from the internal jugular and femoral venous approach. The trainee should have understanding of the potential complications and be prepared for emergent pericardiocentesis should complications arise.

RESPONSIBILITY/SPECIFIC DUTIES:

During the first two years of training the fellow will aim to acquire the cognitive and motor skills to perform left and right heart catheterization. A minimum of six months is dedicated to this area, four at UIHC and two at the VA. In addition during the two months of inpatient CVICU rotations, the CVICU fellow will participate in invasive procedures on patients admitted or transferred to the CVICU. All procedures are performed under the direct supervision of an attending. The fellow is also expected to learn the indications for coronary intervention and post-intervention management. Fellows with an interest in interventional cardiology will be offered advanced training in this field. Overall, the cardiac catheterization laboratory experience will prepare most fellows for level 2 certification (8 months cardiac catheterization laboratory experience and at least 300 invasive diagnostic procedures)

Duties and responsibilities include the following:

1. The fellow will evaluate the inpatients or outpatients referred for cardiac catheterization and complete the pre-cath work up. The fellow will see all inpatients referred for cardiac catheterization on the ward or unit to which the patient is admitted.
2. The fellow will evaluate each patient prior to performing any invasive procedure. This evaluation will include reviewing all pertinent paperwork (H&P, labs, non-invasive studies, etc), perform a focused physical exam, ensure informed consent properly obtained, and answer any questions from the patient or family members.
3. The fellow will discuss cases with the cath lab attending
4. The fellow will arrive at least 30 minutes before the first scheduled case in order to review any outstanding lab data or answer any last minute questions.
5. The fellow will perform all cath lab procedures under the supervision of the cath lab attending physician
6. The fellow will complete the post-procedure paperwork (post-cath orders, brief note for chart, dictate the formal cath report, etc).
7. The fellow will call the house staff and the responsible cardiology fellow (on the consult, CVICU or CHF service) with results and to discuss any pertinent management issues or complications.
8. The fellow will perform a post-procedure groin check, review results, and answer any questions that the patient or their family members may have related to the procedure. Post-cath inpatients must be seen by the end of the procedure day for a post-procedure groin check.
9. The fellow will prepare a case for presentation at the weekly Cath Conference.
10. The fellow may assist the interventional staff with PCI cases if needed.
11. The fellow will maintain a complete and accurate log of all procedures performed.
12. The fellow will screen all outpatient referrals for cardiac catheterization and enter orders for the procedure if appropriate.

SUPERVISION:

The fellow will review all cases with the cath lab attending prior to performing any procedure. All invasive cardiac procedures will be performed under the direct supervision of an invasive or interventional attending cardiologist.

LEARNING OBJECTIVES:

1. Learn the indications and contraindications of cath lab procedures. (B)
2. Learn to recognize and treat immediate cath lab complications. (A,B)
3. Become proficient in the technical aspects of coronary and peripheral angiography, right and left heart catheterization, pericardiocentesis, and temporary pacemaker placement. (B)
4. Learn the indications for and gain exposure to coronary PTCA and stenting. (B)
5. Learn and understand the protocols for correct performance and interpretation of invasive hemodynamic studies, including dobutamine valve studies, intracardiac shunt assessment, pericardial tamponade, and restrictive versus constrictive physiology. (B)
6. Learn proper radiation safety. (B)
7. Develop an academic approach to the proper utilization of invasive cardiac testing. (A,B,C)
8. Gain an appreciation for the role of the Cath Lab staff members, including the technicians, nurses, and administrative staff. (D,E,F)
9. Progress toward the specific training requirements for the desired level of certification as outlined by COCATS 2. (B)

It is important to emphasize that the actual number of procedures required to accomplish clinical competence in cardiac catheterization is somewhat arbitrary, because there is individual variation in cognitive, analytical, and manual-dexterity skills. The listed numbers are therefore the minimum requirements anticipated to properly train the average cardiology fellow, and individual fellows may be required to perform additional procedures as determined by the Cath Lab supervising physician. Minimum training standards for cardiac catheterization are as follows:

COCATS Training Requirements for Diagnostic Cardiac Catheterization

Training Level	Cumulative Duration	Cumulative Number of Cases Performed
I	4	100
II	8	300

PATIENT CHARACTERISTICS/MIX OF DISEASES/TYPES OF CLINICAL ENCOUNTERS:

At UIHC, the patient population that presents for cath lab procedures consists of male and female patients from various ethnic and socioeconomic backgrounds. Patients presenting to the Cath Lab for procedures have a variety of cardiac disorders, including coronary artery disease, valvular heart disease, congestive heart failure, and pericardial disease. Clinical encounters include pre-procedure evaluations in the ambulatory surgery unit and on the inpatient wards, performing the requested procedure, and providing any immediate post-procedure follow-up. Procedures performed include left and right heart catheterization, coronary and peripheral angiography, percutaneous peripheral and coronary intervention, pericardiocentesis, and temporary pacemaker placement.

TEACHING METHODS:

The fellow will review each patient's history and planned procedure with the attending. The attending will supervise the fellow during the procedure, and the fellow will assume progressive levels of responsibility as his or her skill level improves. The attending will review all procedure data with the fellow after the procedure is completed. Fellows on the cardiac cath rotation are expected to attend the weekly cardiac cath conference and also present cases at the joint TCV – cardiac cath conference.

EVALUATION:

1. The goals and objectives for the rotation will be verbally communicated at the beginning of the rotation.
2. The fellow's progress will be reviewed verbally mid-rotation.
3. A standard fellow evaluation form will be completed by the attending at the end of the rotation.
4. The final evaluation by the supervising physician will be based on the fulfillment of the rotation objectives as determined by:
 - a. Personal observation during interaction with the fellow while performing Cath Lab procedures.
 - b. Evidence of literature reviews appropriate for the individual patient and topic.
 - c. Evidence of ability to perform appropriate pre-procedure evaluation.
 - d. Evidence of ability to properly select patients for testing.
 - e. Competent performance of cardiac procedures relative to the fellow's level of training.
 - f. Correct interpretation of procedure data obtained.
 - g. Evidence of ability to provide appropriate post-procedure care.
 - h. Feedback from Cath Lab staff members, other healthcare providers, and patients.

RESOURCES:

University of Iowa Hardin Medical Library (Medline, Up to Date, electronic journals including New England Journal of Medicine, Circulation, Journal of the American College of Cardiology, Journal of the American Medical Association and Medline)

www.cardiosource.com

Heart Disease: A Textbook of Cardiovascular Medicine (7th edition) Eugene Braunwald, editor

Baim and Grossman's Cardiac Catheterization, Angiography, and Intervention (most recent edition)

The Cardiac Catheterization Handbook; Morton Kern (most recent edition)

www.scai.org

UIHC Echocardiography

PURPOSE:

The overall purpose of the echocardiography rotation is to provide trainees with a general overview of all aspects of cardiac echocardiography and to ensure fellows acquire the necessary expertise required to perform and interpret transthoracic, transesophageal, and stress echocardiography studies which are routinely encountered in the practice of cardiology.

Each cardiology fellow will rotate on the UIHC echocardiography service for at least three months during the course of their fellowship. On this rotation, the fellow will learn principles of echocardiography as pertains to the evaluation and management of patients with general cardiac disorders such as heart failure, coronary artery disease, valvular disorders, pericardial diseases, and cardiac masses.

RESPONSIBILITY/SPECIFIC DUTIES:

1. The fellow is the point of contact for all echocardiography services at UIHC.
2. Fellows should generally arrive at the lab by 8:00 am (or immediately following morning conference) Monday through Friday and is expected to stay until all studies are read by the attending cardiologist. Weekend echo coverage is provided by the on-call fellows.
3. Fellows will perform at least 2 transthoracic echocardiographic studies with the sonographers each day. These studies are to be performed and recorded as if the fellow is the sonographer, and the performing fellow should be identified in the study information section. The echo fellow should pre-read all scans performed.
4. Fellows will pre-read as many echocardiograms performed in the lab during the course of the day as possible (at least 10 studies / day)
5. Fellows will formally read the echocardiograms with the attending cardiologist every day.
6. Fellows will review all TEE requests and assist in scheduling the procedure in a timely fashion. The fellow will notify the attending immediately if a TEE is deemed urgent.
7. After fellows are encouraged to oversee and attend all stress echo procedures after the first two weeks in the echo lab during which time they will become acquainted with the performance and interpretation of transthoracic studies.
8. Fellows will attend to all emergencies encountered in the Echo Lab during routine TTEs, TEEs, or stress echocardiograms.
9. The echo fellow is expected to remain in the general vicinity of the Echo Lab throughout the day and is expected to notify the lab staff if there are any conflicting schedules including vacation.
10. Fellows should be available and participate in performing contrast echocardiography or amylnitrite studies, as well as supervising, performing and interpreting exercise and dobutamine echo studies. The echo lab serves as a good venue to acquire the necessary skills in exercise testing as a part of the exercise stress echocardiography laboratory studies.

11. Fellows are responsible for screening all inpatient transesophageal echocardiograms for appropriate indications and contraindications and for preparing both inpatients and outpatients referred for this procedure. The specific responsibilities include: obtaining consent to perform the TEE, assessing the indications and safety of the procedure, reviewing any pertinent pre-procedure data (e.g., labs or TTE), and discussing the case with the echo attending for that day. The pre-requisite to performing TEE's is to perform and document 25 EGD scopy under GI supervision. All fellows must perform and record at least 30 transthoracic echos prior to being eligible to participate in transesophageal echos
12. The echo fellow will attend the weekly echo conference and maybe asked to perform a mini – review of a topic based on an interesting case seen during their rotation through the echo lab.
13. The fellow will keep a log of all the TTEs, TEEs, and stress echos performed and interpreted during the course of the rotation. This log will be reviewed by the program director during the biannual review.
14. The fellow is expected to interpret and sign all EKG's in the ECHO box daily. These EKG's are located in the EKG lab and are to be completed by 10:00 am.

SUPERVISION:

The UIHC echo fellows will pre-read or simultaneously read studies with the staff physician. This will facilitate patient care and teaching as it relates to the etiology, pathogenesis, clinical presentation, natural history, and the treatment of various cardiac disorders. The attending will review and constructively critique the fellow's interpretations of all TTE, TEE, and stress echo studies. The attending will review and constructively critique the fellow's performance of TTE. The attending will directly supervise the fellow's performance of all TEE procedures. The attending will provide didactic sessions on basic concepts in echocardiography and may assign readings or other learning activities as necessary.

LEARNING OBJECTIVES:

1. Obtain training in the principles and methods of echocardiography as related to patients with a variety of cardiovascular diseases. (B)
2. Become proficient in obtaining adequate two-dimensional echocardiographic images with complete spectral and color Doppler data as is routinely acquired. This includes learning proper transducer manipulation and ultrasound system adjustments. Mastering correct transducer manipulation is critical to obtaining optimal image quality and optimal Doppler flow velocity signals. Fellows are expected to acquire a working knowledge of ultrasound instrument settings, such as transducer frequency, harmonics, mechanical index, depth, gain, time-gain-compensation, dynamic range, filtering, velocity scale manipulations, and the display of received signals. (B)
3. Gain an understanding that becoming skilled in the performance of TTEs facilitates the physician's understanding of optimal echocardiographic data acquisition and technical quality and this knowledge adds to proper interpretation and diagnostic accuracy of studies. (B,C)
4. Acquire skill in the various techniques of echocardiography including 2D imaging, color-flow Doppler, and both pulse-wave and continuous-wave spectral Doppler. (B)
5. Learn the indications and limitations of transthoracic echocardiography. (B)
6. Become proficient with the use of echo contrast and its various indications and uses. (B)
7. Become proficient in performing and interpreting transesophageal echocardiograms and learn the indications, limitations, and risks of the procedure. (B)

8. Learn the elements of safe administration of conscious sedation. (A,B)
9. Become proficient in the interpretation of stress echocardiograms and learn the indications, limitations, and risks of the procedure. (B)
10. Acquire basic knowledge of ultrasound physics. (B)
11. Understand the proper use and maintenance of echo equipment. (B,F)
12. Gain exposure to a broad range of acute and chronic cardiovascular problems through direct patient imaging and through formal and informal didactic teaching sessions. (B)
13. Gain a better understanding of the anatomy and physiology associated with a broad variety of cardiac disorders. (B)
14. Learn to use acquired echo data to assess intracardiac pressures and hemodynamics. (B)
15. Learn to use acquired echo data to detect and quantify cardiac valvular stenosis and regurgitation as well as other abnormal flow states, such as intracardiac shunts. (B)
16. Learn to communicate echocardiographic findings at a level appropriate for patients, family members, and members of the health care team. (D,E,F)
17. Gain an appreciation for the role of the members of the echo lab staff, including the sonographers, nurses, and administrative staff. (D,E,F)
18. Learn to generate accurate, thorough yet efficient, and understandable echo reports which clearly answer the question being asked. (D,E,F)
19. Learn to coordinate with other cardiology services (e.g., EP for TEE cardioversions, the Cath Lab for PFO/ASD closures or pericardiocentesis, CHF/TXP service for donor echo studies, etc) and thereby gain an understanding of how the health care delivery system can be used to the maximal benefit for patients. (F)
20. Learn to coordinate Echo Lab procedures with other medical and surgical services and thereby gain an understanding of how the health care delivery system can be used to the maximal benefit of patients. (F)
21. Gain hands on scanning experience by interacting with sonographers that will lead to the ability to perform high quality scans with measure to provide good echo lab quality control. (D,E,F)
22. Complete the specific training requirements for the desired level of certification as outlined by COCATS 2 and the American Society of Echocardiography. (B)
 - a. It is important to emphasize that the numbers of examinations refer to comprehensive two-dimensional and Doppler echocardiographic studies that are diagnostic, complete, and quantitatively accurate.
 - b. The actual number of procedures required to accomplish clinical competence in echocardiographic procedures is somewhat arbitrary, because there is individual variation in cognitive, analytical, and manual-dexterity skills. The listed numbers are therefore the minimum requirements anticipated to properly train the average cardiology fellow, and individual fellows may be required to perform additional studies as determined by the echo lab staff physician
 - c. Minimum training standards for transthoracic echocardiography are as follows:

COCATS Training Requirements for Transthoracic Echocardiography

Training Level	Cumulative Duration	Cumulative Number of Cases Performed	Cumulative Number of Cases Interpreted
I	3	75	150
II	6	150	300
III	12	300	750

All fellows are required to fulfill criteria for Level Criteria for Level I training. In addition, fellows are encouraged to perform 50 supervised TEE studies and 100 exercise echo and dobutamine echo studies.

PATIENT CHARACTERISTICS/MIX OF DISEASES/TYPES OF CLINICAL ENCOUNTERS:

Both men and women of all adult ages and various ethnic backgrounds undergo echo Lab procedures. Patients presenting to the Echo Lab have a variety of cardiac disorders, including coronary artery disease, valvular heart disease, congestive heart failure, and pericardial disease. Procedures performed include the acquisition and interpretation of transthoracic, transesophageal, and exercise and pharmacologic stress echocardiograms. Clinical encounters include brief pre-procedure evaluations on the inpatient wards and in the Echo Lab prior to performing TEEs, performing the requested procedure, and providing any immediate post-procedure follow-up.

TEACHING METHODS:

The attending will review the fellow's performance and interpretation of echocardiographic studies and provide constructive feedback including discussion of accurate interpretation. There will be daily echo reading sessions that will focus on interpretive skills and will cover the range of echo topics in brief case-directed teaching sessions. The attending may assign readings or other learning activities. The attending will directly supervise the fellow in the performance of TEEs. The fellow will assume progressive levels of responsibility for patient care and procedure performance under the supervision of the attending. A weekly didactic and case-based echo conference will be conducted by one of the echocardiography attending with active participation and presentation by the echo fellow.

EVALUATION:

1. The goals and objectives for the rotation will be verbally communicated at the beginning of the rotation.
2. The fellow's progress will be reviewed verbally mid-rotation.
3. A standard fellow evaluation form will be completed by the attending at the end of the rotation.
4. The attending's final evaluation will be based on the fulfillment of the rotation objectives as determined by:
 - a. Personal observation during interaction with the fellow in echo reading sessions and in the performance of echo procedures.
 - b. Evidence of extensive literature reviews appropriate for the individual patient and topic.
 - c. Progressive improvement in the ability to adequately acquire TTE data.

- d. Progressive improvement in the ability to safely and properly perform TEEs.
- e. Progressive improvement in the ability to correctly interpret TTEs, TEEs, and stress echocardiograms.
- f. Participation at Echo Conference.
- g. Feedback from other team members, other healthcare providers (sonographers, echo lab administrative personnel, and patients).

RESOURCES:

University of Iowa Hardin Medical Library (Medline, Up to Date, electronic journals including New England Journal of Medicine, Circulation, Journal of the American College of Cardiology, Journal of the American Medical Association and Medline)

www.cardiosource.com

Heart Disease: A Textbook of Cardiovascular Medicine (7th edition) Eugene Braunwald, editor

Otto's Textbook of Clinical Echocardiography (most recent edition)

Feigenbaum's Echocardiography (most recent edition)

The Echo Manual by Oh et al (most recent edition)

www.asecho.org

UIHC Nuclear Cardiology/Stress Testing

PURPOSE:

The purpose of this rotation is for the fellow to acquire knowledge about the indications, the performance, interpretation and limitations of diagnostic nuclear cardiology and stress testing. Fellows are expected to understand the basic principles of radio-isotopes and myocardial perfusion imaging and gain skills required to independently interpret nuclear perfusion studies. Each cardiology fellow will spend at least 2 months in the nuclear cardiology laboratory; one month at UIHC and the other month is completed during the afternoons on the VA outpatient cardiology service.

Extensive experience with nuclear cardiology and stress testing are provided during the outpatient consults rotation at the Iowa City VAMC and during the nuclear cardiology rotation at UIHC. The fellow is directly responsible to the attending of the exercise/nuclear lab for all components of this rotation. The fellow will be given primary responsibility to perform stress tests, under direct supervision of an attending or a specially-trained exercise physiology professional. Fellows will be instructed in the interpretation of stress test following myocardial infarction for the purpose of identifying high-risk patients and prescribing appropriate exercise regimens for cardiovascular rehabilitation.

Stress Testing:

The studies performed will include maximal and sub maximal exercise tests as well as pharmacologic tests with dobutamine, adenosine, or dipyridamole when appropriate. The fellow will become familiar with exercise physiology and will learn the essentials of preparation for exercise testing (skin preparation, electrode placement, etc) and know the clinical importance of the study findings. Fellows will also be instructed in the interpretation of stress testing for the purpose of identifying high risk patients and for prescribing appropriate exercise regimens for cardiac rehabilitation. In addition to the nuclear cardiology laboratory, exercise testing and dobutamine stress testing is performed in the UIHC exercise treadmill laboratory, echocardiography laboratory and the VA medical center nuclear laboratory and echocardiography laboratory.

RESPONSIBILITIES/SPECIFIC DUTIES:

1. The fellow will work with the Nuclear Exercise Laboratory staff to assess the accurate selection of stress for the patient and can be reasonably expected to answer the clinical question.
2. The UIHC Nuclear fellow will supervise the exercise stress tests with the nuclear laboratory physician assistant. Other exercise stress testing objectives are met during the UIHC echo lab rotation (for performance of exercise and dobutamine stress echocardiography) and during the VA outpatient rotation (for performance and interpretation of exercise stress test).
3. The UIHC Nuclear fellow will be present in the lab most of the morning to supervise and interpret stress tests, perform tracer injections when possible. In the afternoon, the UIHC Nuclear fellow will interpret perfusion images. On the VA outpatient rotation, the VA outpatient fellow is expected to interpret studies with the VA nuclear medicine staff physician.
4. The fellows should -read all stress electrocardiograms and nuclear perfusion imaging studies in preparation for the afternoon reading session with the attending cardiologist.

5. The UIHC nuclear cardiology fellow, VA outpatient fellow and VA cath fellow identify nuclear cardiology studies to be presented at the joint Nuclear Cardiology/Angiographic Correlation Conference.

SUPERVISION:

The attending physician will review with the fellow the appropriateness of test selection at the time of the afternoon reading session. Suggestions for improvement in test selection will be made when appropriate and the rationale and literature basis for an alternative test selection will be discussed. The attending physician will interpret the exercise electrocardiograms and exercise and rest nuclear scans with the fellow each day. Changes in interpretation compared to the fellow's preliminary interpretation will be discussed, incorporating literature-based principles. Staff physicians from cardiology and nuclear medicine will review the myocardial perfusion studies with the fellow in the Nuclear Cardiology/Angiographic Correlation conference.

LEARNING OBJECTIVES:

The overall basic objectives of this rotation include understanding the principles of myocardial perfusion and blood flow, factors determining flow, coronary flow regulation, vasoreactivity, coronary flow reserve, regional flow differences, and flow variability; understand the principles of radioactivity, radioactive decay, radionuclide production, radionuclide generators, photon interactions with matter, and spectrum radiating detectors; develop a basic understanding of the instrumentation, techniques, and principles involved in nuclear imaging, including collimation, resolution, contrast, localization, noise, , SPECT, PET, image reconstitution methods, and attenuation and scatter correction; become familiar with the various methods of stress testing (treadmill, upright and reclining bicycle, pharmacologic), including indications, exclusions, safety, and technique and understand the advantages, disadvantages, and differences between various protocols for image acquisition; understand the differences between the various radioisotopes used in nuclear cardiology, including their energy, half lives, and organs of elimination and gain a proper understanding of the value of perfusion imaging in the diagnosis, prognosis, and management of patients with coronary artery disease.

The specific objectives are:

1. Obtain training in the principles of noninvasive detection and prognostic assessment of patients with known or suspected coronary artery disease. (A,B)
2. Gain an understanding of the risks and benefits of various stress testing modalities. (A,B)
3. Gain an understanding of the implications of various pharmacologic agents on stress test accuracy. (A,B)
4. Gain training in safely conducting stress tests. Learn to recognize and manage emergencies arising in the course of stress testing. (A,B)
5. Gain skills in the interpretation of exercise electrocardiograms and stress and rest nuclear cardiac tests. (B)
6. Gain understanding of nuclear methods for measurement of left ventricular function and the complimentary roles of myocardial perfusion and left ventricular function in patient assessment and management. (B)
7. Gain understanding of the role of stress testing in preoperative cardiac risk assessment, using published series and guidelines. (B,C)
8. Gain understanding of the value and limitations of stress test results in the assessment of patient diagnosis and prognosis, and in clinical management. (A,B)

9. Gain an appreciation for the role of the staff members in the non-invasive lab, including the technicians, nurses, and administrative staff. (D,E,F)
10. Learn to generate an accurate and easily understood report for stress tests and nuclear perfusion studies. (D)

Each fellow is expected to perform and interpret over the 2 year period a minimum of 80 hours of nuclear cardiology study interpretation during the two month training period in Nuclear Cardiology, which fulfills level 1 ACC guidelines for training. These studies include SPECT and planar myocardial perfusion imaging, gated blood pool studies, and PET viability studies. The fellow will participate in daily readout sessions with the attending physician from nuclear medicine or cardiology responsible for the interpretation of the studies. Level 2 training may be attained in nuclear cardiology upon completion of fellowship by spending four to six months in the nuclear cardiology laboratory and by interpreting at least 300 studies including 40 hands on cases studies with direct patient experience. In order to obtain a nuclear license, fellows are required to take mandatory physics courses. These didactic sessions maybe undertaken at the University of Iowa or through commercial vendors targeted to providing the didactic courses in an intensive two –four week period.

PATIENT CHARACTERISTICS/MIX OF DISEASES/TYPES OF CLINICAL ENCOUNTERS:

The training in Nuclear Cardiology is based at UIHC for one month and half-day afternoon during the VA outpatient rotation for 2 months. In addition, fellows may opt to undertake additional training in nuclear cardiology during their elective rotations. Training based at UIHC includes men and women of all adult ages, with a wide range of body habitus and medical co-morbidities, and varied ethnic and socioeconomic backgrounds. Although the majority of patients present with chronic or subacute symptoms, many patients present from the Emergency Department after acute myocardial infarction has been excluded and the patient's presenting symptoms have been stabilized. Most patients are referred for evaluation of chest pain or exertional dyspnea, but a significant proportion of patients are referred for preoperative cardiac risk assessment, assessment of myocardial viability, or assessment of known or suspected arrhythmias. Diagnostic test options include exercise electrocardiography, exercise and rest myocardial perfusion imaging, pharmacologic coronary vasodilation stress, and inotropic (dobutamine) stress tests. The training in Nuclear Cardiology at the VA includes predominantly male patients with a wide variety of cardiovascular disorders or cardiovascular risk factors.

TEACHING METHODS:

Nuclear cardiology studies are formally read each day in the late afternoon. The attending physician will review the studies read by the fellow (baseline ECG, stress ECG, and perfusion imaging) and offer constructive criticism and further instruction as needed. In addition to study interpretation, didactic lectures covering the basics of nuclear cardiology are given during the core curriculum conference series and during the cath-nuclear correlation conference.

EVALUATION:

1. The goals and objectives for the rotation will be verbally communicated at the beginning of the rotation.
2. A standard fellow evaluation form is completed by the attending at the end of the rotation.
3. The attending physician's final evaluation is based on fulfillment of the rotation objectives as determined by:
 - a. Personal observation during interaction with the fellow.
 - b. Evidence of a growing knowledge base in exercise testing and nuclear cardiology over the course of the rotation.
 - c. Ability to identify appropriate versus inappropriate test selections.
 - d. Accuracy of exercise electrocardiogram interpretation.
 - e. Accuracy of nuclear cardiology test interpretation, including interpretation in the Nuclear Cardiology/Coronary Angiography Correlation conference.
 - f. Appropriate handling of any patient emergencies.
 - g. Feedback from ECG monitoring technicians, nurses, and nuclear medicine technologists in the Exercise Nuclear Laboratory.

RESOURCES:

University of Iowa Hardin Medical Library (Medline, Up to Date, electronic journals including New England Journal of Medicine, Circulation, Journal of the American College of Cardiology, Journal of the American Medical Association and Medline)

www.cardiosource.com

Heart Disease: A Textbook of Cardiovascular Medicine (7th edition) Eugene Braunwald, editor

www.Asnc.org

Nuclear Cardiac Imaging: Principles and Applications textbook, Ami E. Iskandrian, Editor

Electrophysiology (EP)

PURPOSE:

The overall purpose of the EP rotation is to provide trainees with a general overview of all aspects of cardiac electrophysiology and to ensure fellows acquire the necessary expertise required to manage the electrophysiology disorders routinely encountered in the practice of cardiology. A minimum of 2 months is dedicated to this area and should include 10 elective cardioversions, fulfilling level 1 ACC guidelines for training. During this rotation, the fellow will work under the supervision of electrophysiology attending physician and interact closely with the subspecialty electrophysiology fellows. The fellows are expected to acquire knowledge and experience in the diagnosis and management of arrhythmias, the indications and limitations of electrophysiologic studies, the appropriate use of antiarrhythmic agents and defibrillator devices, understand noninvasive and invasive techniques used to assess patients with arrhythmias and become acquainted with the basics of pacemaker /ICD management and device interrogation.

RESPONSIBILITY/SPECIFIC DUTIES:

1. The UIHC EP fellow is the point of contact for the EP consult service at UIHC. EP consults at the VAMC are performed by the VA outpatient and inpatient fellow under the supervision of the EP staff physician designated to the VA.
2. The UIHC fellow receives and reviews all EP inpatient consults, performs the initial evaluation, reviews all pertinent laboratory data and related test results, develops an initial management strategy, presents the patient to the EP attending, and writes the final consult.
3. The fellow will conduct daily rounds on all EP inpatients and communicate management plans to the patient's primary team. The fellow will review each patient with the EP attending and write an appropriate follow up consult progress note.
4. The fellows will evaluate patients in the Arrhythmia Clinic or as instructed by the EP staff physician. The fellows will coordinate with the subspecialty EP fellows regarding participation in device interrogation and programming in the ICD/pacer clinic or on patients admitted to the inpatient cardiology service and ICU.
5. The fellow will assist the EP attending during procedures performed in the EP lab, or on the wards and will progress to higher levels of participation including performance of EP studies as the fellow's skill level allows. The fellow will communicate the patient's study information to the house staff post-procedure and do the appropriate post-procedure checks (x-ray, operative site, labs, etc).
6. The fellow will participate, perform and / or interpret ECGs, Holter monitors, event recorders, exercise stress tests for dysrhythmia management, tilt table tests, and signal-averaged ECGs.
7. The fellow may present selected cases, with guidance of the attending, at EP conference.
8. The fellow is expected to interpret and sign all EKG's in the EP box daily. These EKG's are located in the EKG lab and are to be completed by 10:00 am.
9. The UIHC EP fellow is required to attend the weekly EP conference

SUPERVISION:

The attending physician and fellow will care for patients as a team to facilitate patient care and teaching as it relates to the etiology, pathogenesis, clinical presentation, natural history, and the treatments of the various electrophysiology disorders seen. The attending will review the fellow's presentation, review and constructively critique the fellow's plan of care, confirm the fellow's physical exam findings, review and confirm the fellow's notes, and review and supplement the fellow's teaching of other members of the team. The attending may assign readings or other learning activities as necessary. The attending will supervise the fellow during invasive procedures based on the level of the fellow's skills.

LEARNING OBJECTIVES:

1. Obtain basic training in the concepts of clinical cardiac electrophysiology, including: normal physiology of the cardiac conduction system, pathophysiology of bradydysrhythmias and tachydysrhythmias, and mechanisms of AV block. (A,B)
2. Gain basic understanding of the indications, use limitations, and complications of diagnostic EP studies and radiofrequency ablation therapy. (A,B)
3. Gain basic training and experience in the use of pharmacologic and non-pharmacologic options for treating cardiac dysrhythmias. (A,B)
4. Gain basic training in the indications, interpretation, and clinical application of ECG interpretation, ambulatory electrocardiography (Holter) monitoring, event recorders, exercise testing for dysrhythmia assessment, tilt table testing, signal-averaged ECG, and implantable loop recorders. (A,B)
5. Gain basic training in the fundamentals of cardiac pacing, recognition of normal and abnormal pacemaker function, knowledge of temporary pacing and permanent pacing, knowledge of pacing modes and the general approach to programming, surveillance, and troubleshooting of pacemakers and implantable cardioverter-defibrillators (ICDs). (A,B)
6. Understand the indications for cardiac pacemakers, ICDs, and resynchronization devices. (A,B)
7. Gain basic training in the insertion of temporary pacemakers and the indications and techniques for elective and emergent DC cardioversion. (A,B)
8. Gain basic training in arterial and venous access for the placement of catheters and performance of EP studies. (A,B)
9. Evaluate patients in both the inpatient and outpatient setting who may have an electrophysiology disorder by taking a thorough problem-directed history, performing a careful physical examination, and generating a differential diagnosis and plan of care. (A,B)
10. Provide follow-up care for both inpatient and outpatient consult patients to assess success and adverse effects of treatment, including anti-dysrhythmic agents. (A,B)
11. Explain the etiology, pathogenesis, clinical presentation, and natural history of major EP disorders, including syncope, bradydysrhythmias, tachydysrhythmias, and sudden cardiac death. (B)
12. Learn to choose appropriate EP-related diagnostic tests. (A,B)
13. Learn to recognize and manage EP emergencies. (A,B)
14. Gain an appreciation for the role of the staff members in the electrophysiology, including the technicians, nurses, and administrative staff. (D,E,F)
15. Learn to generate a comprehensive written consultation carefully explaining the diagnosis and management plan for patient's with EP disorders. (D,E,F)

PATIENT CHARACTERISTICS/MIX OF DISEASES/TYPES OF CLINICAL ENCOUNTERS:

Training occurs at both UIHC and the VAMC providing a wide range of pathology and a diverse patient population. Both men and women of all adult ages and of various ethnic backgrounds are seen. Clinical encounters including inpatient consultation, outpatient consultations, and peri-procedural care. Both non-invasive and invasive procedures are performed, including the interpretation of ECGs, Holter monitors, event monitors, exercise testing for dysrhythmia management, tilt table testing, and signal-averaged ECGs as well as the participation in performing temporary and permanent pacemaker placement, ICD and cardiac resynchronization device placement, DC cardioversion, diagnostic EP studies, radiofrequency ablation, loop recorder implantation, and trans-septal catheterization.

TEACHING METHODS:

The attending will review the fellow's presentation, review and constructively critique the fellow's plan of care, confirm the fellow's physical exam findings, review and confirm the fellow's notes, and review and supplement the fellow's teaching of other members of the team. The attending may assign readings or other learning activities. The attending will supervise the fellow in the performance of procedures. The fellow will assume progressive levels of responsibility for patient care and procedure performance under the supervision of the attending.

EVALUATION:

1. The goals and objectives for the rotation will be verbally communicated at the beginning of the rotation.
2. The fellow's progress will be reviewed verbally mid-rotation.
3. A standard fellow evaluation form will be completed by the attending at the end of the rotation.
4. The final evaluation of the staff physician will be based on the fulfillment of the rotation objectives as determined by:
 - a. Personal observation during interaction with the fellow.
 - b. Evidence of extensive literature reviews appropriate for the individual patient and topic.
 - c. Ability to construct a logical management plan.
 - d. Inclusion of appropriate physical examination.
 - e. Appropriateness of use of diagnostic tests.
 - f. Correct interpretation of diagnostic tests.
 - g. Appropriate selection of pharmacologic and non-pharmacologic therapies.
 - h. Competent performance of cardiac procedures relative to the fellow's level of training.
 - i. Appropriate follow-up.
 - j. Feedback from other team members, other healthcare providers, and patients.

RESOURCES:

University of Iowa Hardin Medical Library (Medline, Up to Date, electronic journals including New England Journal of Medicine, Circulation, Journal of the American College of Cardiology, Journal of the American Medical Association and Medline)

www.cardiosource.com

Heart Disease: A Textbook of Cardiovascular Medicine (7th edition) Eugene Braunwald, editor

Fogoros' Electrophysiologic Testing

Zipes and Jalife's Cardiac Electrophysiology: From Cell to Bedside (most recent edition)

ACC/AHA/NASPE 2002 guideline update for implantation of cardiac pacemakers and anti-dysrhythmia devices. Gregoratos G et al. Circulation. 2002; 106:2145-61.

www.hrsonline.org

Other Rotations

ADULTS WITH CONGENITAL HEART DISEASE

During the research year (usually the second year of fellowship), fellows attend the Adults with Congenital Heart Disease clinic every eight weeks over a twelve month period. Working closely with faculty from Pediatric Cardiology, this rotation provides a comprehensive exposure to the diagnosis, assessment and management of outpatient presentations of most forms of congenital heart disease commonly encountered in adults. Resources include textbooks: Perloff's Congenital Heart Disease in Adults and Perloff's "The Clinical Recognition of Congenital Heart Disease".

VASCULAR MEDICINE

The goals of this training are to perform and become familiar with non-invasive assessments of peripheral vascular disease utilizing Doppler ultrasound. Fellows will evaluate patients with the assistance of vascular laboratory technicians. Trainees will have a hands-on experience in assessing patients with vascular disease using various modalities outlined below. A full range of noninvasive tests is available in the Vascular Laboratory including tests for: Peripheral Arterial Disease (PAD) - Doppler arterial exams of the legs or arms (Physiologic testing), duplex ultrasound scan of the extremity arteries; Cerebrovascular Disease - Carotid artery duplex scan; Deep Venous Thrombosis (DVT)- venous duplex scan of the arms or legs and inferior vena cava (IVC) scan; Renal Artery Disease - Renal artery duplex scan and duplex scan of the renal veins; Aortic Aneurysms - aortic duplex scan, duplex scan of peripheral arteries for aneurysms.

Fellows will be required to attend one half-day per week sessions each week for the entire month of the stress/nuclear medicine rotation. These sessions will occur on a morning that does not interfere with continuity clinic. The same weekday am session will be followed for the remainder of the month. Besides the allocated time in the vascular medicine laboratory, fellows are expected to learn skills in the diagnosis, assessment and management of peripheral vascular disease in the patient population seen in the UIHC cardiology and VA continuity of care clinics. Fellows will also receive didactic lectures in peripheral vascular disease at core curriculum conference and during the weekly divisional clinical conference

CARDIAC REHABILITATION

The goals of cardiac rehabilitation training are to understand the indication for rehabilitation, medical evaluation for rehabilitation, understand how to implement an exercise program, and teaching patient's lifestyle modifications and learning the organization of psychosocial support in the UIHC cardiac rehabilitation program CHAMPS unit. The population will include patients with myocardial infarctions, coronary artery disease, heart failure, peripheral arterial disease, angina, cardiomyopathy, coronary artery bypass grafting, and valve replacement.

Fellows rotating on the nuclear medicine service will be involved with the CHAMPS team and will be working with them in a multidisciplinary approach. Fellows will be involved in phase I and phase II cardiac rehab. For phase I, fellows will assess patients in the intensive care unit after an MI and initiate an exercise and nutritional program prior to the discharge. For phase II rehab, fellows will see patients in the CHAMPS unit and monitor them on stationary exercise equipment. Fellows will also receive didactic lectures on cardiac rehabilitation during the core curriculum lecture series.

ELECTIVE ROTATIONS

Most of our fellows avail of one to two elective rotations. They usually choose the UIHC echo laboratory or UIHC Nuclear Medicine rotation or a combination of the two rotations to augment their training skills to meet COCATS Level 2 training requirements in Nuclear Medicine or Echocardiography. Since we do not have a scheduled rotation in advanced cardiac imaging in Cardiac CT and MRI, many fellows utilize the elective rotations for an advanced cardiac imaging month (which includes Echo, Nuclear, Cardiac CT and/or MRI). Fellows may also opt for a rotation through cardiothoracic surgery. However, most fellows choose to acquire TEE skills in the intraoperative setting by accompanying the UIHC echo lab staff physician to perform TEE in the OR. This gives a brief exposure to the fellows to operative techniques especially with regard to valve replacement or valve repair. In addition, fellows on the cardiac cath rotation also attend the joint TCV- cath lab conference.

CARDIAC MRI AND CARDIAC CT

The goals of the cardiology fellowship program trainee are to acquire Level 1 training in cardiac MRI and cardiac CT which focuses on basic understanding and familiarity with these newer cardiac imaging modalities. This is accomplished by reviewing the ACC-SAP in Cardiac MRI and CT and attending the core curriculum lecture series geared to cardiac CT and MRI. Cardiac MRI studies maybe reviewed at the workstation in Radiology or in the UIHC echocardiography laboratory. Cardiac CT studies maybe reviewed at the workstation in Radiology or the anticipated workstation installed in the Cardiology Division in the Cardiac Catheterization laboratory film review area. Fellows will be expected to participate in the performance and interpretation of cardiac CT studies during the VA outpatient and inpatient blocks and sometimes on the UIHC consult and echocardiography laboratory rotations. Fellows are encouraged to participate in the performance and interpretation of Cardiac MRI studies during their UIHC echocardiography laboratory rotation. Level 1 training in cardiac CT and MRI includes mentored interpretation of 50 cases.

Continuity Clinic

PURPOSE / OVERVIEW

The overall purpose of the continuity skills is to develop and demonstrate skills as a consultant cardiologist in the outpatient setting and to learn to address chronic cardiovascular disease management issues on a long term basis.

The goals of the ambulatory experience are to provide exposure to outpatient cardiology practice, including both consultative and continuity experiences, and to provide a means for clinical follow-up of patients recently discharged from the hospital. This experience provides an opportunity to follow and manage patients for a full 3 years in an outpatient setting. Fellows participate in a continuity clinic at both UIHC and the IC VAMC one-half day every week during the course of the 3 year cardiology fellowship program. Fellows see an average of 2-3 new patients and 3-5 return patients on their clinic day. Fellows are directly responsible for care of the patients to which they have been assigned. At the VA, one attending physician is present full-time during the clinic to supervise fellows in training. At UIHC, each fellow works closely with a single faculty physician providing a uniquely intimate view of the practice patterns of a given faculty physician.

The patient population at the Iowa City VAMC Clinic currently includes mostly adult males. Patients are referred to the clinic for a wide variety of reasons including routine management of common cardiology problems, preoperative evaluations before noncardiac surgery, evaluations for potential revascularization procedures (surgical and interventional), post-revascularization follow-up, follow-up of recently discharged patients, and referrals for complex cardiology problems. Medical records are easily accessed through the VA electronic medical record system (CPRS). Laboratory data and results of radiology and other diagnostic tests are also readily accessible through the electronic medical record. Computer terminals are provided in each clinic office room. At least one administrative staff member (case manager) from the cardiology section is routinely available during this clinic to assist fellows and staff physician. The cost effectiveness of various options in treating outpatient cardiovascular disease will be discussed between the faculty member and fellows. Clinical follow-up of patient outcomes will be used for quality assessment with discussions focused toward quality improvement. Fellows will be instructed on relevant issues of risk management as pertaining to patients with cardiac disease.

The Cardiology Clinic at the University of Iowa Heart Care Center (UIHC) serves male and female patients with a wide variety of cardiovascular diseases. Both primary cardiac care and tertiary, consultative evaluations are provided on a routine basis. Fellows work closely with an individual staff member based on fellow preferences and allocation by chief fellow and fellowship program director. Fellows are primarily involved with provision of care and follow these patients longitudinally through the course of the 3-year fellowship experience.

RESPONSIBILITY:

The fellow evaluates new cardiology referrals and provides follow-up care for patients with cardiovascular diseases. The fellow performs the initial evaluation, formulates a plan of care, and presents the case to the attending cardiologist. The fellow is responsible for ordering and following up on all appropriate studies.

SUPERVISION:

Attending cardiologists are present for all clinics. All patients are presented to the designated staff physician in the clinic.

LEARNING OBJECTIVES:

1. Evaluate patients in the outpatient clinical setting who have a wide variety of general cardiovascular disorders by taking a thorough problem-directed history, performing a careful physical examination, and generating a differential diagnosis and plan of care. (A,B)
2. Learn to treat common cardiovascular disorders in the outpatient setting in accordance with established practice guidelines. (A,B,C)
3. Learn to generate a well-organized written consultation that clearly conveys the management plan. (D,E)
4. Provide follow-up care to assess success and adverse effects of treatment. (A,B)
5. Learn to accurately code and bill for services. (F)
6. Gain an appreciation for the role of the ancillary staff members in the outpatient clinic setting, including the nurses, administrative staff, and social workers. (D,E,F)

PATIENT CHARACTERISTICS/MIX OF DISEASES/TYPES OF CLINICAL ENCOUNTERS:

All clinical encounters are in the outpatient setting and include both new patient consults and follow-up care. Consults referred cover a wide variety of cardiovascular diseases, including coronary artery disease, heart failure, valvular disease, and dysrhythmias. At the UIHC Cardiology, male and female patients of all adult ages and of various ethnic backgrounds are seen. The patients referred to the VAMC are mostly male. No procedures are formed in either clinic.

TEACHING METHODS:

The attending will review the fellow's presentation, review and constructively critique the fellow's plan of care, confirm the fellow's physical exam findings, and review and confirm the fellow's notes. The fellow will assume progressive levels of responsibility for patient care under the supervision of the attending.

EVALUATION:

1. The goals and objectives for cardiology clinic will be reviewed at the beginning of each academic year.
2. The fellow's progress will be reviewed verbally and a standard fellow evaluation form will be completed by the attending every 6 months (December and June of each year).
3. The final evaluation by the staff physician will be based on the fulfillment of the continuity clinic objectives as determined by:
 - a. Personal observation during interaction with the fellow.
 - b. Evidence of extensive literature reviews appropriate for the individual patient and topic.
 - c. Ability to construct a logical management plan.
 - d. Inclusion of appropriate physical examination.
 - e. Appropriateness of use and application of diagnostic tests.

- f. Appropriate selection of pharmacologic and nonpharmacologic therapies.
- g. Appropriate follow-up.
- h. Feedback from other team members, other healthcare providers, and patients.

RESOURCES:

University of Iowa Hardin Medical Library (Medline, Up to Date, electronic journals including New England Journal of Medicine, Circulation, Journal of the American College of Cardiology, Journal of the American Medical Association and Medline)

www.cardiosource.com

Heart Disease: A Textbook of Cardiovascular Medicine (7th edition) Eugene Braunwald, editor

CARDIOVASCULAR DISEASE FELLOWSHIP EDUCATIONAL GOALS BY YEAR GROUP

INTRODUCTION

The University of Iowa Hospitals and Clinics Fellowship Program in Cardiovascular Disease is a three year program designed to train clinical and academic cardiologists. We are committed to training fellows to assume leadership role in cardiovascular medicine in basic and clinical research and clinical cardiology. The curriculum is organized to provide increasing levels of responsibility for trainees with respect to patient care and procedure performance. Adequate progression through the curriculum is assessed by evaluating each fellow's clinical judgment, clinical skills, medical knowledge, procedural skills, professionalism, communication skills, leadership ability, and continuing scholarship. At all times during their training, fellows are expected to conduct themselves with the highest of ethical standards and are expected to display integrity, honesty, compassion, and respect to all members of the health care team, patients, and patient family members. Fellows should always be strong advocates for all patients under their care and should utilize the health care system to maximize the benefit to each individual patient while respecting the patient's expressed wishes. In the end, the welfare of the patient should be the fellow's primary concern.

FIRST YEAR FELLOWSHIP TRAINING

General:

The overall purpose of the first year of training is to provide new fellows with a broad exposure to all aspects of clinical cardiology as well as ample introductory experience to a wide variety of invasive and non-invasive cardiac procedures. Fellows will also be introduced to both clinical and basic science research. By the end of the first year, fellows will be able to evaluate cardiac patients and to initiate care appropriate for a wide variety of acute and chronic cardiac conditions but will not be expected to be experts in either clinical care or procedural skills. The goals for the first year of training are for fellows to be introduced to the full range of cardiovascular disease clinical and research opportunities, identify a specific area of interest and a projected career path, be paired with an appropriate mentor, and to select a research project.

Clinical Judgment and Skills:

By the end of the first year of fellowship training, fellows should be able to obtain an accurate and complete cardiac history and to perform a thorough but directed cardiac physical examination for patients being evaluated for a wide variety of cardiovascular diseases. During their first year of training, fellows will learn the proper role of the various invasive and non-invasive cardiac procedures and tests. Using the information available from the history, physical examination, and test results, first year fellows should be expected to be able to develop a differential diagnosis and a plan of care for common acute and chronic cardiovascular disease states. Additionally, first year fellows will be expected to identify life-threatening cardiovascular conditions and emergencies and to be able to initiate prompt therapy. First year fellows will gain experience in understanding the pathophysiologic basis of cardiac conditions. First year fellows should be able to contribute to patient management discussions on rounds in conjunction with the staff physician

Medical Knowledge:

First year fellows will begin to build the critical knowledge base that will permit them to function as competent well-rounded cardiologists. This knowledge will be acquired by reading current cardiology literature sources and standard textbooks as well as via didactic lecture sessions. Clinical knowledge will be gained in the following areas: coronary artery disease, myocardial diseases and heart failure, congenital heart disease, valvular heart disease, peripheral vascular disease and diseases of the aorta, cardiovascular prevention, hypertension, pericardial diseases, cardiac dysrhythmias and clinical electrophysiology, cardiothoracic surgery, cardiac rehabilitation, and pulmonary hypertension. First year fellows will begin to learn the basic literature related to cardiovascular testing and procedures and will begin to develop interpretive skills.

Procedural Skills:

First year fellows will learn the indications, contraindications, and potential complications related to each major cardiovascular procedure. First year fellows will also begin to develop a working knowledge of the risk/benefit assessment that must take place prior to performing an invasive cardiac procedure. First year fellows will begin to learn how to safely perform procedures and to interpret the data obtained. These procedures will include electrocardiograms, ambulatory ECG monitoring, transthoracic and transesophageal echocardiograms, cardiac catheterization (hemodynamic and angiographic studies), exercise and pharmacologic stress testing, cardiac CT and MRI, electrical and chemical cardioversion, temporary pacemaker placement, and nuclear cardiac imaging. First year fellows will be instructed in how to properly document procedure findings and will be expected to document a thorough and accurate report on any procedure performed. By the end of the first year, fellows should be expert in the pre-procedural and post-procedural assessment of patients referred for cardiac testing and should participate in the performance of invasive procedures only under the direct supervision of an attending cardiologist.

Teaching:

First year fellows will be expected to provide teaching to medical students and residents on the basics of common cardiovascular conditions and routine bedside invasive procedures especially on the UIHC consult service, VA inpatient service, UIHC CVICU service and UIHC heart failure / transplant service. Teaching methods should include actively participating in case discussions on rounds, conducting brief teaching sessions, and introducing house staff to common cardiology literature sources (journal articles, textbooks, etc).

Professionalism:

First year fellows are expected to conduct themselves with exemplary professionalism at all times, as evidenced by the display of honesty, integrity, respect, and compassion when caring for patients and interacting with patient families, referring providers, and other members of the health care team. First year fellows will accept responsibility for the care of cardiac patients and will be held accountable for conducting themselves with the highest of ethical standards at all times.

Communication Skills:

First year fellows will learn how to write a thorough, informative, and instructive cardiac consultation note as well as accurate and detailed procedure notes. First year fellows will learn to verbally communicate effectively with patients, families, and all members of the health care team. Fellows will learn the importance of maintaining complete and accurate medical records easily accessible to referring providers.

Leadership:

First year fellows should be able to provide guidance for medical students and residents as it relates to routine patient care. First year fellows should be able to participate in management discussions on teaching rounds in conjunction with the service attending.

Continuing Scholarship:

First year fellows will be expected to develop a reading program that will build the foundation of basic cardiology knowledge necessary to become a competent clinical cardiologist. Fellows will learn the significance of keeping current with the literature in order to be able to adapt their clinical practice as new advances are made. Attendance at journal club will allow the fellows to keep abreast of the current literature. Fellows will improve their ability to critically review the cardiovascular literature and to correctly apply the literature in their clinical practice. Fellows will be introduced to both clinical and basic science research as it applies to cardiovascular diseases in order to help them select their fellowship research project.

SECOND YEAR FELLOWS

General:

Second year fellows will continue to build upon the knowledge and skills gained during the first year of training and will begin to focus on their particular area of interest. Second year fellows will be given greater latitude in patient management decisions in the continuity of care clinic. During the second year, the fellow's research project should be well-established, and each second year fellow should be able to present his/her activities at the dedicated research conference. Depending upon the outcome of their research work, some second year fellows may be positioned to submit their findings in abstract form to national or regional scientific meetings.

Clinical Judgment and Skills:

Second year fellows will improve upon the clinical judgment and skills acquired during their first year of training by continued participation in patient care in a variety of settings and will work to master the development of acute and chronic management plans for patients with cardiovascular diseases. Second year fellows will be expected to understand the pathophysiologic basis of common cardiovascular diseases and will use this knowledge to help guide clinical management decisions. Fellows will gain a better understanding of how best to utilize cardiac procedures in the care of patients, will demonstrate continued improvement in test result interpretation, and will continue to refine their understanding of the risks and benefits of the various cardiac procedures. During the second year, fellows will continue to improve their ability to synthesize the cardiology literature and apply it in an evidence-based manner to the care of their patients.

Medical Knowledge:

Second year fellows will continue to advance their knowledge base by critically reviewing the cardiology literature and continuing to read standard cardiology texts. They are expected to regularly attend the core curriculum conference, journal club and the weekly clinical cardiology conference.

Procedural Skills:

Second year fellows will be skilled in determining the appropriateness of planned procedures. The development of procedural skills will be limited by the number of research months during the second year of training.

Teaching:

In addition to teaching medical students ECG 's, second year fellows are expected to help introduce first year fellows to the program and to assist with bedside procedures (e.g., PA catheter placement, temporary pacemaker placement, transthoracic echocardiography, etc) especially when the second year fellows are on weeknight or weekend call for the intensive care unit

Professionalism:

Second year fellows will continue to perform their duties with utmost professionalism utilizing the highest of ethical standards.

Communication Skills:

Second year fellows will work to improve their written and verbal communication skills relative to direct patient care reporting. Second year fellows will continue to gain experience in interacting with patients, family members, and all members of the health care team especially in the continuity of care clinic. Second year fellows will understand the importance of maintaining complete and accurate medical records easily accessible to referring providers.

Leadership:

Second year fellows will be expected to be role models for first year fellows and to set the highest professional and ethical standards for them to follow.

Continuing Scholarship:

Second year fellows will continue to update their cardiovascular knowledge base via critical review of the literature and continued reading of standard cardiology texts. Second year fellows will be expected to be able to interpret the cardiology literature correctly and to apply it appropriately in an evidenced-based manner to the care of individual patients. Second year fellows will be expected to formulate a meaningful research experience in conjunction with an appropriate mentor. Second year fellows will present their research project at the start and at the end of the research rotation blocks. Second year fellows may apply for research grant funding after discussion with their research mentors and gathering preliminary data.

THIRD YEAR FELLOWS

General:

The overall purpose of the third year of fellowship is for trainees to perfect their clinical patient care and procedural skills and to be able to practice evidence-based medicine for the full spectrum of cardiovascular diseases. By the end of their third year, fellows should be deemed capable of practicing clinical cardiology competently and independently and to safely and expertly perform all procedures. Third year fellows should fully meet all six of the ACGME general core competencies. Additionally, third year fellows may submit the results of their research project as an abstract to the appropriate forum. They will also be encouraged to submit full-length manuscripts for publication in clinical or scientific journals. The faculty will provide guidance and support with regard to such scholarly endeavors.

Clinical Judgment and Skills:

Third year fellows will improve upon the clinical judgment and skills acquired during the first two years of training by further participation in patient care in a variety of settings and will be expected to apply evidence-based medicine to develop comprehensive acute and chronic management plans for the full spectrum of cardiovascular diseases. Third year fellows will be expected to skillfully select the most appropriate cardiac tests for individual patients and to expertly apply the results leading to the safest and most optimal care. By the end of the third year, fellows should be able to manage all cardiac patients expertly and should be able to function independently as a consultant cardiologist.

Medical Knowledge:

Third year fellows will continue to build their cardiology knowledge base by further review of the available literature, and by the completion of the training program, fellows will be expected to be well-versed in all aspects of the clinical cardiovascular diseases literature. Third year fellows will be able to expertly interpret cardiac tests and to apply the results appropriately to the care of individual cardiac patients.

Procedural Skills:

Third year fellows will perfect their procedural skills and will become skilled in performing procedures in complicated patients. Third year fellows will have a thorough understanding of the risks and benefits of the procedures they perform, will be able to manage associated complications, will be able to expertly interpret and apply all data obtained, and will be able to effectively communicate procedure results to patients and referring providers.

Teaching:

Third year fellows will be expected to teach medical students, residents, and junior cardiology fellows on clinical services, laboratory and non-laboratory setting and actively participate in conferences.

Professionalism:

Third year fellows will continue to conduct themselves professionally at all times and with the highest of ethical standards.

Communication Skills:

Third year fellows will be able to write complete, accurate, and informative consults as well as detailed and accurate procedure reports. Third year fellows will be able to communicate effectively with patients, their families, and all members of the health care team.

Leadership:

Third year fellows should be able to function as team leader for the clinical cardiovascular services under the direction of the assigned staff physician. Third year fellows will be expected to mentor junior fellows in all aspects of the training program.

Continuing Scholarship:

Third year fellows should have a well-established educational program that will continue into their practice and allow them to stay current with the cardiology literature and should be expert at interpreting and applying new data to enhance patient care. By the end of third year, fellows are expected to demonstrate the outcome of their research activities in an appropriate formal setting. This presentation is usually completed at the research conference at the end of the second year of training. However, fellows may choose to present their research project results as an oral presentation to the Division of Cardiovascular Diseases, a written abstract submitted to a local or national meeting, or a manuscript submitted to a peer reviewed journal. Those interested in pursuing a career in academic medicine will become acquainted with the benchmarks of academic success and will gain an understanding of the extramural funding process as it pertains to their specialty area.

LINES OF RESPONSIBILITY

Responsibilities unique to each individual rotation are outlined in the curriculum section for that rotation.

1. **Inpatient Services** (UIHC consults, UIHC CVICU, UIHC heart failure/ transplant, UIHC Electrophysiology, VA inpatient cardiology, VA outpatient cardiology):
 - a. Supervising Physician: The staff physician is responsible for the assignment of patient care and for supervision of the fellow's management of the patients on the inpatient and outpatient services. The staff physician will review the rotation expectations at the beginning of the rotation. The attending physician will provide verbal feedback and a written evaluation at the end of each rotation. The attending physician will conduct daily management rounds which will include brief bedside focused discussion. The staff physician will be readily available and easily contacted by the fellow to discuss patient care or other issues related to the rotation.
 - b. Cardiology Fellow: The cardiology fellow is responsible for the daily management of all patients on the cardiology service to which the fellow is assigned. The UIHC CVICU and UIHC heart failure / transplant fellows will review overnight issues and new admissions with the house staff on the cardiology team prior to morning rounds. The consult fellows will receive and triage all consult requests and begin the initial management of these patients. The fellow will assist the house staff in performing necessary procedures. The fellow will either provide adequate documentation of patient care or ensure that house staff notes are complete and accurate. The fellow will supervise all house staff members on his or her assigned team.
2. **Outpatient Continuity Clinic** (UIHC Cardiology Clinic, VA Cardiology Clinic):
 - a. Supervising Physician: The attending physician will supervise the management of all cardiology clinic patients. All new patients and follow up patients will be presented to the attending physician and written documentation of the encounter will be placed in the chart. The attending physician will provide verbal feedback and a written evaluation twice a year.
 - b. Cardiology Fellow: The cardiology fellow is responsible for evaluating, managing, and providing follow-up care for his or her assigned cardiology clinic patients under the supervision of the staff physician in the clinic. The fellow is responsible for providing appropriate documentation on all patient encounters. The fellow is expected to answer clinic staff and patient phone calls in a timely fashion.
3. **Laboratory Rotations (UIHC Cath Lab, VA Cath Lab, UIHC Echo Lab, Nuclear Lab, UIHC EP)**
 - a. Supervising Physician: The staff physician is responsible for the supervision of all procedures performed in the individual cardiology laboratories. The staff physician will assign specific fellow duties based on the individual fellow's level of training and expertise. The staff physician will outline the rotation expectations at the beginning of the month. The staff physician will provide verbal feedback and a written evaluation at the end of the month. The staff physician will monitor the fellow's performance of procedures and review the fellow's interpretation of all diagnostic tests. The staff

physician will provide concise focused teaching sessions during weekly conferences or during performance and interpretation of laboratory studies. The staff physician and/or the fellow will discuss testing results with the patient and the patient's family and provide appropriate documentation.

b. Cardiology Fellow: The cardiology fellow will perform all required pre-procedure duties (ensure appropriate consent obtained, review labs, write pre-procedure orders, etc). The fellow will supervise all non-invasive testing and remain in the lab area to be available for emergencies. If the fellow must leave the area, the lab staff must be notified who is the appropriate contact person for emergencies. Fellows will perform invasive procedures under the supervision of the attending physician in accordance with their level of training and expertise. The fellow is responsible for any necessary post-procedure care. The staff physician and/or the fellow will discuss testing results with the patient and the patient's family and provide appropriate documentation.

4. **Call:**

a. Supervising Physician: A list of staff physicians on call for the various services including consults, intensive care unit, cath lab, heart failure/ transplant service, electrophysiology, VA consults) will be distributed at the beginning of each month. The attending physician must be easily reached by either pager or phone to staff overnight consults, discuss critically ill inpatients, or to come in to directly supervise invasive procedures (TEE, cardiac catheterization, etc).

b. Cardiology Fellow: Each night, there is one fellow on call for UIHC and VA (also called F1 call) and another fellow on call for UIHC CVICU and heart failure /transplant service. Interventional cardiology call is covered by the subspecialty interventional cardiology fellows. The cardiology fellow on call is responsible for providing consultation to all services (including ER, inpatient medical and surgical services, VA inpatient medical and surgical services and UIHC and VA outpatients) except the CVICU / heart failure service. The UIHC cardiology fellow on call will come in and evaluate any urgent consults or critically ill inpatients and discuss the management plan with the staff physician on call. The UIHC CVICU call alternates between the fellows on the CVICU and heart failure transplant fellow. Weekend call coverage for F1 call is provided mostly by first year and second year fellows. Weekend call coverage for CVICU and heart failure is provided by CVICU and CHF fellow and other cardiology fellows based on the fellow call schedule. The fellows will perform any urgent non-invasive procedures and provide the initial interpretation under the supervision of the attending physician. The fellow will perform emergency invasive procedures in accordance with his or her level of training and expertise under the direct supervision of the staff physician. The fellow will provide adequate documentation to fully relay the management plan and any procedure results to the team responsible for the patient's care.

5. Non-Teaching Patients:

In the event of a life-threatening emergency, the cardiology fellow will be responsible for the care and stabilization of “teaching” and “non-teaching” patients alike. If there is a difference of opinion over the management plan for “non-teaching patients”, the patient’s attending physician will be responsible for all subsequent evaluation, management decisions, and order writing that is necessary. Currently, “non-teaching” patients are only those who are post-procedure (either from the EP or from the interventional laboratory) or are low risk patients (e.g. exclude acute coronary syndrome, completion of a prolonged course of antibiotic or those receiving oral anticoagulation). These patients are managed by the cardiology nurse practitioners who are supervised by a designated staff physician. The weekend and weeknight coverage is provided by the nurse practitioner and/or the designated staff physician.

FELLOWSHIP RESPONSIBILITIES

GENERAL FELLOWSHIP RESPONSIBILITIES

Responsibilities specific to individual rotations are described in each rotation's curriculum. General responsibilities that apply to the daily performance of fellowship duties will be listed in this section.

1. In general, daily work hours are from 8:00 am to 5:00 pm Monday through Friday. Obviously, work hours will vary based on the required duties of each rotation. Fellows on inpatient services with early morning rounds will need to arrive at a time that allows adequate preparation for rounds. Fellows on procedure rotations are expected to arrive in time to evaluate the patient prior to starting the planned procedure.
2. Fellows will provide timely, safe, and effective care for all patients he/she is responsible for.
3. Fellows will document all patient care in the medical record in a timely fashion.
4. Fellows will attend scheduled cardiology teaching conferences and initial attendance documentation sheet.
5. Fellows will review each rotation's curriculum with the attending at the beginning of the month and strive to achieve the outlined goals and objectives.
6. Fellows will keep an accurate and up-to-date procedure log. This log will be reviewed at each 6 month evaluation with the program director.
7. Fellows will review the call schedule and perform all call duties as scheduled. If fellows switch call, the page operator must be notified.
8. Fellows are expected to carry their pagers at all times while on duty and to respond to pages in a timely fashion.
9. Fellows are expected to supervise and teach all house staff members on his/her team.
10. Fellows are expected to communicate with the attending physician, house staff members of the team, the patient, and family members as frequently as is necessary to facilitate excellent patient care. This includes discussing urgent issues that arise on call with the on-call attending.
11. Fellows will check out all critically ill patients, pending test results, and other pertinent information to the on-call fellow prior to leaving for the day.
12. Fellows will comply with the program's duty hour guidelines and report any problems with compliance to the program director. This includes not exceeding duty hours due to excessive moonlighting.
13. Fellows will notify the Chief Fellow of any unplanned absence in order to ensure that continuity clinics are cancelled and rescheduled appropriately and that rotation/call duties are covered. Coverage for scheduled vacation and conferences is pre-arranged at the beginning of the year.
14. Fellows will conduct themselves in a professional manner at all times and will treat all others, including colleagues, faculty, residents, medical students, ancillary staff, referring health care providers, and patients and their families, with the utmost respect.
15. Fellows will develop a personal self-study program that is guided by the fellowship curriculum.
16. Fellows will adhere to all University of Iowa GME-related policies.
17. Fellows will adhere to all UIHC and VAMC institutional policies.
18. Fellows will complete all rotation, faculty, and program evaluations in an honest, constructive, and timely fashion.
19. Fellows will comply with the licensure requirements of the State of Iowa.
20. Fellows will comply with all state and federal laws governing the practice of medicine.
21. Fellows will abide by the institutional order writing policy.

CALL DUTIES

1. Call begins at 5 pm and ends at 8 am on weekdays. Saturday and Sunday call is from 8 am to 8 am.
2. Each day there is one fellow on call for UIHC and the VAMC. Interventional call is covered by the CVICU fellow and the interventional fellow.
3. The CVICU fellow on call will provide back-up for the first year fellow. Back-up includes providing telephone advice regarding patient management issues as well as assisting with procedures.
4. Each day will have an assigned attending on call to discuss consults. Two attendings are on call for the CVICU and Heart Failure/Transplant team. Another attending will be assigned to cover echo call (TEEs and donor studies), and one interventional attending will be on call to cover the cath lab. The attending call schedule will be published at the beginning of each month.
5. The official daily and yearly call schedule is posted on the internet. Any call changes should be marked on this schedule, and the hospital operator of the appropriate facility should be notified.
6. A call room is available on the 5th floor of the General Hospital (C54) for fellows on general cardiology call. A call room is also available for fellows in the CVICU.
7. Fellows will see all urgent consults on call and page the responsible attending to discuss the plan of care.
8. Fellows will provide assistance to the CVICU residents at UIHC and to the MICU residents at the VAMC as needed to help manage critically ill patients and new admissions. Fellows are expected to come in to see any critically ill patient.
9. Fellows will assist with vascular access, PA catheter placement, elective cardioversion, and transthoracic echocardiography as needed. Once an individual fellow has received the requisite training and has been deemed competent in performing these procedures, he/she may perform the procedures without a senior level fellow or attending directly present. The results of procedures are discussed and reviewed with the appropriate attending. Advanced procedures, including diagnostic cardiac catheterization, transvenous pacemaker placement, coronary angiography, TEE, and RV biopsy are performed only under direct supervision of the attending.
10. The fellows on call Saturday and Sunday for the UIHC and VAMC will follow-up with new consults and any existing consults from the week. They are also responsible for all EP consults, urgent TTEs, rounding with the attending on consults, and taking overnight call. The CVICU/CHF fellows on call Saturday and Sunday are responsible for all ICU admissions and interventional procedures required of these patients in the cath lab.

3-DAY HOLIDAY WEEKENDS

1. In general, Monday should be treated in the same manner as Saturday or Sunday.

CARDIOLOGY CHIEF FELLOW RESPONSIBILITIES

The Chief Fellow is a senior-level fellow assigned administrative duties related to the training program that are in addition to usual fellow duties.

These responsibilities include:

1. Provide leadership at the fellow level.
2. Serve as liaison between the general cardiology fellows and the fellowship program director and division director.
3. Attend divisional faculty meetings to represent fellow interests and to discuss issues and changes in the fellowship program.
5. Prepare the yearly call and rotation schedules in conjunction with the fellowship program director. This will include coordinating requests for vacation and meetings, as well as approving and arranging schedule modifications throughout the year.
6. Arrange rotation and call coverage for unplanned absences.
7. Serve as the first point of contact for fellow problems.
8. Serve as a role model to encourage fellow conference attendance
9. Assist with supervision of junior fellows.
10. Assist program director with developing an orientation schedule for new fellows, including the July/August introductory lecture series.
11. Assist program director with updating core curriculum and ensuring all elements covered on a rotating two-year basis.
12. Assist with the selection of new fellows (recruiting, screening applications, interview process).
13. Participate in appropriate GME meetings with the Internal Medicine department.
14. Be responsible, in conjunction with the program director, for fellow compliance with call schedule and other fellowship duties.
15. Help coordinate conferences requiring direct fellow participation/presentation including board review conference series.

ROTATION COVERAGE

Division of Cardiovascular Diseases Fellows' Coverage Policy

The coverage policy has been developed to allow for continuous patient care without any disruptions due to emergency situations. The protocol for coverage has several features to allow for adequate coverage in all situations.

Fellows requiring coverage on an immediate basis must themselves be involved in an emergent, unforeseeable incident that could not have been otherwise prevented. These events will require the requesting fellow to contact the chief fellow either in person or via phone and discuss the specifics of the coverage options. When the decision has been made by the chief fellow to grant coverage, the name of the available coverage fellow will be provided. For situations where the requesting fellow is incapable of contacting the coverage fellow, the chief fellow will assist. Otherwise, it is then the responsibility of the fellow who is requesting coverage to contact the coverage fellow either in person or via phone and discuss the specifics of the coverage requirements. Also, it is the responsibility of the fellow requiring coverage to provide full details regarding pertinent patient care issues either over the phone or via email to the covering fellow.

The pool of fellows available to cover will depend on the time of day coverage is required and the rotations from where fellows can be withdrawn. A hierarchical system has been developed to determine the order of coverage. The order of coverage will be first, the nuclear fellow, second, the echo fellow (if there are two echo fellows), and third, the elective fellow. Fellows may be pulled from these services Monday-Friday from 8am to 5pm when coverage is required. The next pool of coverage will be provided by the back-up fellow. This is a pre-determined schedule developed in advance and it will rotate a F2 starting every Monday (regardless of holiday /long weekends) through Sunday. This coverage pool exists for nights (after 5pm) and weekends (starting 5pm on Friday until 8am on Monday). Coverage requested for non emergent reasons will require to be paid back to the fellow providing coverage.

Third year fellows are allowed to take a one week vacation without having to find coverage during the UIHC consult service if the division is provided notice 60 days in advance. For these specific situations, the chief fellow will first utilize the back-up fellow, if available and not involved in an ongoing research project and then follow the aforementioned hierarchy to provide adequate coverage. Fellows will not be allowed to take a vacation or go to any conferences without 60 day advance notice signed by the staff attending on that particular service. For fellows requiring coverage for conferences not already provided, the back-up fellow and the hierarchy system will be used. For medical emergencies that require week-long coverage on services, the responsibility may be split between two or three fellows (for example, echo, nuclear fellow etc) and this will be at the discretion of the chief fellow. For the rare circumstance where coverage is required on nights or weekends and the back-up fellow is ill, coverage will have to be provided by the hierarchical model described above.

Finally, to keep the coverage system equitable for all those involved, all coverage's will be documented on a spreadsheet for future reference. Most importantly, the pay-back system will be tracked for all coverage issues except for vacation and conference coverage.

The above policies are meant to serve as guidelines to be as fair as possible to all fellows. Minor adjustments in the enforcement of the above policies will be at the discretion of the chief fellow, fellowship program coordinator and fellowship program director. Issues of concern with regard to this policy may be periodically reviewed and refined to suit the needs of the fellowship program.

RESEARCH/PRESENTATIONS

Cardiology trainees are expected to take an active role in clinical and basic science research during the period of fellowship training. Research mentorship is initiated during the first year of clinical training to help guide the trainee towards a clinical research experience related to his field of clinical sub specialty, or to a basic science laboratory and specific mentor in anticipation of an investigative career in cardiovascular diseases. The program makes scholarship a high priority and strongly encourages presentation of original research at a national meeting, completion of original research which is published in a peer reviewed journal or substantial scholarly work related to cardiology and presented at the Work In Progress research meeting, as a requirement for completing the training program. Guidance in planning research directions with the trainee is provided by the Fellowship Advisory Committee (Drs. Anderson, Benson and Jagasia). Research is supervised directly by the individual faculty mentor.

During the first year of training, fellows are exposed to the spectrum of research opportunities available within the Division of Cardiovascular Disease and outside the division. After discussion with the Fellowship Advisory Committee, fellows identify a research mentor by late fall of the first year. Most fellows, especially those embarking on basic science research project are expected to submit a grant to support their research efforts during the research year (usually the second year of training). This is an important learning exercise in terms of formulating a hypothesis, learning the tools necessary to answer a significant question, and analyzing the pertinent literature. Under appropriate circumstances, the fellow will apply for research funding from the American Heart Association – Heartland Affiliate or the Interdisciplinary Research Fund available through the Cardiovascular Research Center other organizations (e.g. HRS) during the fall of the first year. Support and critique will be provided by members of the Fellowship Research Committee and the faculty mentor. Fellows are encouraged to present their research at national meetings including those of the American Heart Association, the American College of Cardiology, and other major regional or national societies.

EVALUATIONS

Evaluations are an important part of training that should occur frequently and provide constructive feedback. The purpose of frequent evaluation is to ensure that fellows learn and grow commensurate with their level of cardiology training. In addition, evaluations help identify potential problems early so that issues can be addressed before they become irreparable and adversely affect the fellow's ability to function as a well-rounded cardiologist. It is extremely important that the supervising staff physicians outline the goals and objectives at the beginning of each rotation and provide fellows with feedback during the mid point of the rotation. Performance evaluation is based on the standard ACGME core competencies and the goals and objections for each rotation set forth by the fellowship curriculum.

1. At the end of each monthly rotation, the attending physician will provide verbal feedback and a written evaluation. These evaluations will be reviewed with the program director at the biannual evaluation and signed by the fellow. If the fellow disagrees with the evaluation, it can be discussed with the program director. A copy is attached in Appendix III.
2. Twice a year, the clinic preceptors will provide a written evaluation of each fellow's clinic progress.
3. Once a year, fellows will evaluate the fellowship rotations that have been completed. These evaluations will be used to determine if the curriculum goals and objectives are being met as outlined and to solicit suggestions from fellows as to how training can be improved.
4. Twice a year, the program director will meet with each fellow review the fellow's overall progress. The fellow's monthly evaluations, procedure log, conference attendance, and duty hour compliance will be reviewed. In addition, the fellow's long-range plans will be discussed to ensure that the fellow's rotation structure will allow the fellow to achieve his/her goals. An attempt will also be made to pair the fellow with an appropriate mentor to help guide the fellow during training. A written summary of the review will be provided by the program director, reviewed and signed by the fellow, and placed in the fellow's file. If the fellow disagrees with the evaluation; it can be discussed with the fellowship program director or the director of the division of cardiology.
5. 360° evaluations will be performed twice a year. A copy is attached in Appendix IV.
6. Fellows will complete an anonymous evaluation of the supervising staff physician for every rotation. These evaluations are collected and reported to the chairman, department of medicine and the division director and ultimately back to the individual staff physician.
7. Fellows will complete an anonymous evaluation of the fellowship program yearly. A copy is attached in Appendix V.
8. The program director will write a final evaluation for each graduating fellow. The program director evaluation will confirm the fellow's ability to function independently as a practicing cardiologist.
9. Twice a year the fellows complete an anonymous Self/Peer assessment. A copy is attached in Appendix VI.

POLICIES AND PROCEDURES

PROCEDURE DOCUMENTATION

Fellows are required to keep a detailed procedure log. An updated log is to be presented to the program director for review at the biannual fellow evaluation.

1. The following procedures require documentation:
 - ECG interpretation (patient identification information not required)
 - elective cardioversion
 - temporary transvenous pacemaker insertion
 - programming and surveillance of permanent pacemakers and ICDs
 - right heart catheterization
 - left heart catheterization, including coronary angiography
 - cardiac biopsy
 - peripheral angiography and aortography
 - exercise and pharmacologic stress testing
 - transthoracic echocardiogram (2D and Doppler) acquisition and interpretation
 - transesophageal echocardiograms
 - stress echocardiograms
 - ambulatory ECG recording (Holter) interpretation
 - radionuclide studies of myocardial function and perfusion interpretation
 - pericardiocentesis
 - intra-aortic balloon pump placement
2. Specialized procedures requiring extra training:
 - percutaneous cardiovascular interventions
 - percutaneous peripheral vascular interventions
 - intravascular ultrasound (IVUS)
 - intracardiac EP studies
 - permanent pacemaker/ICD placement
3. Documentation must include the procedure performed, patient's name and medical record number, date of the procedure, attending cardiologist, indication for the procedure, results, and any complications.

CRITERIA FOR ADVANCEMENT

Fellows will be advanced to the next PGY level based on clear evidence of progressive academic and professional growth over the range of cardiovascular diseases.

For a first year cardiology fellow to advance to the next level, he/she must be able to:

- a. Obtain an accurate and thorough directed cardiac history and perform a detailed cardiac physical examination.
- b. Synthesize the history, physical exam, laboratory, and diagnostic testing information into an organized and meaningful presentation.
- c. Develop a differential diagnosis based on the available data.
- d. Demonstrate progressive development in the management of common cardiovascular diseases.
- e. Effectively lead a team of internal medicine residents and medical students on the intensive care unit service.
- f. Educate medical students and internal medical residents in the basics of cardiovascular disease.
- g. Discuss indications, contraindications, and possible complications of routine cardiac procedures.
- h. Show progress in the performance of cardiac procedures under the supervision of attending cardiologists.

For a second year cardiology fellow to advance to the next level, he/she must be able to:

- a. Show continued progress in the elements required to advance from first to second year fellow level
- b. Use all history, physical examination, laboratory data, and diagnostic testing results to narrow differential diagnosis to a presumptive diagnosis and initiate therapy.
- c. Approach patient management in an evidence-based manner.
- d. Perform cardiac procedures safely under the supervision of attending cardiologists.

For a third year fellow to successfully graduate from the fellowship training program, he/she must be able to:

- a. Meet all of the above listed criteria for advancement.
- b. Meet the six ACGME core competencies.
- c. Demonstrate competence in all areas of clinical Cardiology.
- d. Be able to function independently as a cardiologist.
- e. Safely perform usual invasive and non-invasive cardiac procedures

Written offers of reappointment for the next academic year (starting the following July 1st) will be provided to each fellow in the final quarter of each academic year.

DUTY HOURS

The University of Iowa Fellowship in Cardiovascular Diseases program complies fully with the ACGME, Internal Medicine RRC, and University of Iowa Hospitals and Clinics duty hour guidelines. These guidelines are summarized as follows:

1. Duty hours are limited to 80 hours per week averaged over a 4 week period.
2. Fellows will be provided 1 day in 7 free from all educational and clinical responsibilities, averaged over a 4 week period.
3. Continuous on-site duty must not exceed 24 consecutive hours. Fellows may remain on duty for up to 6 additional hours to participate in didactic activities, transfer care of patients, conduct outpatient follow-up clinics, and maintain continuity of patient care.
4. No new patients may be accepted after 24 hours of continuous duty.
5. Adequate time for rest and personal activities will be provided. This will consist of a 10-hour time period provided between all daily duty periods.

Cardiology fellow work hours are subject to the 80 hours per week limit as stated above, and this includes moonlighting. Although call is taken from home, fellows may be required to return to the hospital to assist in the care of a critically ill patient or to perform a procedure. The hours the fellow spends in the hospital count toward the 80 hour limit for the week.

All fellows are required to submit their duty hours at the end of the month. The duty hours are regularly monitored by the program coordinator and the program director. Fellows should report to the program director if the duty hour guidelines are violated in any way. The duty hour data is reviewed to confirm that the program is in compliance with the duty hour policy.

MOONLIGHTING

Moonlighting is permitted in accordance with the University of Iowa Hospitals and Clinics moonlighting policy. Moonlighting must not interfere with assigned fellowship duties and total work hours including moonlighting must not exceed 80 hours per week. In general, moonlighting shifts should not start before 7 pm and should end by 7 am. Fellows are not allowed to moonlight during the intensive care unit rotations. Fellows are not allowed to take call from home and moonlight at the same time. Each fellow will complete a "Request to Engage in Moonlighting Activities" form each year, and moonlighting will be allowed at the discretion of the program director. It is the responsibility of the program director to monitor moonlighting activities and moonlighting hours to ensure compliance with institutional and ACGME policies. Fellows cannot be required to moonlight. Fellows are expected to incorporate moonlighting hours into the duty hours when completing the duty hours reporting form. A copy of this policy is available for review in Appendix VII.

ORDER WRITING

Order writing is governed by the policy set forth by University Hospital. A copy of this policy is available for review in Appendix VIII.

PAGERS

A pager will be provided at the beginning of the first year of fellowship. A revised pager list is created every July and periodically updated through the year.

LAB COATS/SCRUBS

Two lab coats are provided at the beginning of the first year of fellowship. Additional lab coats may be provided as needed. Scrubs are available in the changing rooms on 4 RCP. Policies on lab coats and scrubs are available on line at

<http://www.uihealthcare.com/depts/graduatemedicaleducation/benefits/services.html#coats>

PARKING

Fellow parking is provided in the Finkbine parking lot. The CVICU fellow and the Heart failure fellow will be provided parking closer to the hospital in Lot 43. Parking policies are distributed during the hospital wide Graduate Medical Education orientation at the beginning of the first year of fellowship. For more information on parking, including special parking procedures on football weekends, please refer to the GME website at

<http://www.uihealthcare.com/depts/graduatemedicaleducation/index.html>

or contact Kelly Breffle in the GME office, C123 GH #356-2395.

ID BADGES

A UIHC ID badge is required to be worn in the hospital and will provide after hours access through designated areas into the hospital. Fellows will be provided ID badges during the Internal Medicine fellows orientation at the beginning of the first year of fellowship.

LIBRARY FACILITIES

The University of Iowa Hospitals and Clinics medical library; also known as the Hardin library is easily accessible to fellows. The fellows also have access to ACCSAP (self assessment program) and Mayo DVD review series which needs to be signed out from the program coordinator. All fellows have electronic access to the Hardin Library for Up-to-Date; electronic medical journals (e.g. New England Journal of Medicine, Journal of the American Medical Association, Circulation, Journal of the American College of Cardiology, etc.). The website for the Hardin library is <http://www.lib.uiowa.edu/hardin/> and on-line facilities are available 24/7 without restrictions due to weekends and holidays. Fellows have easy access to PubMed and Medline through any computer terminal within UIHC. A list of Professional Journals and societies, along with their web links, can be found at <http://www.healthcare.uiowa.edu/InternalMedicine/Links/ProMedLinks.htm>

In addition, at the beginning of fellowship training and during the course of training, the program director and the chief fellow will periodically obtain standard textbooks through industry sponsorship if available.

COMPUTER ACCESS

A network account will be created and given to each fellow, along with a Hawk ID and password, before the first day of fellowship orientation by the fellowship coordinator. Fellows will need their Hawk ID for access to e-mail, shared network folders, blackboard, Share-point and the various patient information systems such as IDX and Inform. For computer, network account, and Hawk ID assistance please contact the Help Desk, 335-6500 helpdesk-hcis@uiowa.edu

FELLOW OFFICE/MAILBOXES

A fellow office and annex fellow office with work space, internet access, a printer, and a scanner is located on the 3rd floor of General Hospital in the division of Cardiovascular Diseases. Each fellow has a mailbox in the cardiology division. Fellows should frequently check e-mail since a lot of University based correspondence is now communicated via e-mail.

TIME OFF

Meetings

Senior Fellows (F3) may attend one national meeting (usually ACC, AHA, TCT, or HRS depending on subspecialty interests). The division will provide \$750 for travel expenses to senior fellows to attend an annual meeting. All the F1 and F2 fellows will NOT receive a travel allowance to attend an annual meeting if they are not presenting a research abstract. However, if the F1 or F2 or F3 fellows have an abstract accepted at a national meeting as a first author then all reasonable expenses will be reimbursed by the research mentor and /or fellowship program.

Vacation

Standard for all UIHC residency / fellowship programs. Please refer to the GME website for details on vacation

<http://www.uihealthcare.com/depts/graduatemedicaleducation/benefits/paidtimeoff.html>

Fellows are eligible for 15 working days paid time off each year. There are certain rotations during which vacations should not be taken during cardiology fellowship training – e.g. UIHC CVICU, CHF, EP, VA inpatient and outpatient. Junior fellows are allowed to take one week vacation during their UIHC cath lab rotation and senior fellows can take a one week vacation during the VA outpatient rotation. Most F1 fellows take vacation during the non-invasive blocks (echo/nucs). All fellows are required to provide at least 60 days notice to change VA clinics. UIHC clinics changes are more complex and should be discussed with the UIHC faculty member 8 weeks prior to canceling clinics as well.

Other

Emergency leave for sickness or pressing family situations, paternity or maternity leave needs to be discussed on an individual basis with the chief fellow and fellowship program director. Fellows are requested to cooperate amongst themselves to arrange for coverage if a short break (1-2 days) is needed at a short notice to attend to an urgent situation. Please refer to the GME website for more details maternity leave.

<http://www.uihealthcare.com/depts/graduatemedicaleducation/benefits/paidtimeoff.html>

*Fellows must notify Marlene Blakley, E314-2 GH, to fill out appropriate travel request and coverage memo for all absences and call switches.

QUALITY IMPROVEMENT

The Fellowship Advisory Committee consists of the fellowship program director, associate program director and the director of the division of cardiology. This committee meets regularly with the fellows to discuss any issues related to fellowship training. The program director also meets regularly with the fellows to address areas of concern for the fellows. These issues are discussed in this forum and methods for improvement are developed and implemented as possible. Changes that have come due to this committee's actions in the past include restructuring back up coverage and improving conferences. The chief fellow is regularly invited to attend the division faculty meetings.

GRIEVANCE PROCEDURE

A fair and consistent method of review of fellow concerns and/or grievances is outlined in the official grievance policy that can be reviewed on the GME office website <http://www.uihealthcare.com/depts/graduatemedicaleducation/policy/index.html>. If a fellow has a grievance with any aspect of the training program, he/she is encouraged to bring the matter immediately to the program director. If the issue is not resolved to the satisfaction of the fellow after discussion with the program director, the grievance may be formally presented in writing to the division director, chairman of internal medicine or GME Office for further consideration.

MISCELLANEOUS RESOURCES

Crisis Center (351-0140) - Phone line available 24 hours each day.

Psychiatry (Clinic 353-6314) (Department of Psychiatry) - For alcohol or substance abuse concerns or other personal problems, such as adjustment disorders, major affective disorders (particularly depression), marital counseling, behavioral management or parenting techniques for difficult children and education evaluation for children with special needs.

UI Employee Assistance Program (319/356-2431) - Services are confidential and designed to offer assistance with personal, work-related and family problems, including job stress, alcohol or other drug dependency, emotional concerns, marital concerns, parent/child conflicts, financial issues, psychiatric concerns, performance worries and other relationships or medical/health concerns. A triage and crisis service is available 24 hours each day at 319/335-2085.

More information on substance abuse identification and intervention can be found on <http://www.uihealthcare.com/depts/graduatemedicaleducation/policy/index.html>

INDIVIDUAL PORTFOLIOS

All fellows have an individual portfolio started for them at the beginning of their first year of training. The portfolios include evaluations, duty hours, procedure logs, research, etc. and are kept securely in the Program Coordinator's office. Fellows may review their own portfolio during working hours, 8 am – 5 pm weekdays.

CONTRACT

Each fellow receives a contract for each year of his/her training program.

- New or “incoming” fellows: GME office sends new or incoming fellows contracts (and pertinent attachments which relate to GMEC and UI Hospitals and Clinics approved policies) to their homes.
- Returning fellows: Contracts for existing fellows are sent to the program for signatures.

Once signed, a copy of the contract should be sent or delivered to the GME office for filing purposes. A contract example is attached in Appendix IX.

BENEFITS

Fellows attend a Benefits orientation at the beginning of the first year of fellowship training which provides information on financial, health care, and non-medical insurance benefits. Information on benefits is also available on the GME website.

<http://www.uihealthcare.com/depts/graduatemedicaleducation/benefits/statement.html>

RECRUITMENT AND SELECTION POLICY

The Fellowship in Cardiovascular Disease Program participates in the National Resident Matching Program (NRMP).