CARDIOLOGY HEART FAILURE-TRANSPLANT CARDIOLOGY INPATIENT SERVICE CURRICULUM
UNIVERSITY OF COLORADO HOSPITAL
INTERNAL MEDICINE RESIDENCY PROGRAM

UCH Congestive Heart Failure (CHF) Service: Intern Roles and Responsibilities
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Definition: The CHF service primarily cares for patients with systolic heart failure, heart transplants, and ventricular assist devices (VADs) followed longitudinally in the UCH Advanced Heart Failure Clinic and Cardiac Transplantation Clinic. This is a group of patients often referred by community cardiologists for consideration of advanced HF therapies and are thus complex and often quite ill. New onset HF and HF patients not followed in the HF clinic most often go to CICU (general) cardiology service. HF patients with a non-cardiac related admitting diagnosis most often go to the floor teams with a CHF or Consult cardiology consultation. The team consists of:

- R1 – dedicated CHF intern (1 month rotation)
- R1 – CHF/hepatology intern (2-week block, then switches with the hepatology intern
- NP – inpatient NP, coordinating the service and transitions of care M-F
- CHF Fellow - second-year (PGY5) cardiology fellow (1 month rotation)
- CHF Attending – 1 of 7 faculty specializing in HF/TX
- +/- Super Fellow – PGY7 cardiology fellow acquiring a year of specialized training
- +/- CHF Pharmacist

Schedule: The interns are expected to work from approximately 6A-8P, 6 days per week. ACGME requires that interns have at minimum 10 hours off per day (maximum work day 14 hours), and an average of 1 day off per week. CHF admits from 7A – 5P Monday through Friday and 7A – 12P on the weekend. **Work hour violations are not acceptable. It is the responsibility of the intern to meet work hour requirements.** As such, interns must plan accordingly, with sign out beginning adequately in advance of 8P. If work is not complete, it must be signed out to the resident, CHF fellow, and/or CHF attending.

Days off: Interns will have 4 days off per month. For continuity of patient care, there will be no weekend days off (the HF NP is off on weekends and there is usually a covering fellow). An intern cannot be off if the other intern is in clinic. At the beginning of the rotation, the HF NP will coordinate days off based on these parameters.

Backup/Support: Admissions should be staffed with the CHF fellow & HF NP, if available; if not, staff with the on-call cardiology resident. The CICU cardiology residents (R2) will also serve as a resource for the CHF interns if general care questions arise. The illness severity can be very high on this service, so interns and cross-covering **interns/residents should have a low threshold for calling the HF NP/CHF fellow during the day, on-call cardiology fellow after hours, and/or the HF attending directly at any hour with any patient issues**.

Admissions: The ED will call admissions to the CHF fellow or on call cardiology resident. Patients followed in the HF clinic will usually have clinic notes by the following providers: Allen, Ambardekar, Brieke, Cantu, Lowes, Shakar, Lindenfeld, or

Wolfel (Lindenfeld and Wolfel see some non-HF patients in their private clinics that can be admitted to general cardiology). Any questions about appropriateness of admissions should be directed to the HF NP, HF attending, or on-call cardiology fellow.

Overflow: As described above, the CHF service will take over any CHF patients admitted overnight. The night team will pass off CHF patients at 7A. Every patient requires a daily progress note, **even those admitted after midnight** by the CICU covering service.

Handoffs: There will be formal signout rounds between CHF interns, CHF fellow, and the on-call cardiology resident/intern at approximately 5P daily, with clear parameters for when the fellow is to be called, including: a change in IV vasoactive/inotropic drips, ventricular arrhythmias, presumed ischemia, or change in immunosuppression. **The CHF team members will be expected to leave their phone number on the sign out, as the night intern will call them directly between 7:30 – 7:45P**. If the NP sees an intern's patients on his or her day off, the remaining intern should communicate with the NP to make sure that signout is updated for every patient and to clarify who will be signing out to cross-cover.

Clinics: Per clinic coordinators.

Intern Rounding/Patient Care Expectations:

General Roles

It is expected that the interns, as a team, will be the primary care takers for the patients primarily assigned to the HF service. The HF NP will supervise admissions, review patient care orders with the interns, facilitate discharges (including making discharge follow up appointments, writing medications prescriptions, and arranging for lab follow ups), and help the interns navigate the logistics of patient care at UCH (eg. show interns how to get a patient a PICC line, arrange for a liver biopsy, transfer someone to the unit, etc). The HF fellow and attending are responsible for HF-VAD-transplant consult patients without the interns. Interns will have supervision at all times by the HF NP, HF fellow, and HF attending.

Specific Expectaions

--The HF NP will distribute the primary HF service patients among the 2 interns at the beginning of the rotation. The HF NP will also distribute overnight and new admissions among the interns.

--Interns are expected to be the **primary care taker for up to 8 patients each**. This includes pre-rounding, presenting on rounds, writing orders, calling consults, following up on tests/consults, updating the signout, and formally signing out to the cross cover team.

--Interns should write their name and pager on the chart for the patients that they are covering so they can be the primary contact provider for nurses and consultants. These should be updated on intern days off by the co-interns so that people know whom to call.

--To facilitate efficient patient care, the intern not presenting should write orders during rounds on their co-interns patients. This will also help the co-intern know the overall

plan for patient care when they are covering their co-interns patients. The NP should supervise orders (e.g. check dosing corrected for renal function) and write orders when one intern is off.

--When one intern is off, the co-intern who is not off should cover the off intern's patients, up to 8 total patients (e.g. if the "on" intern has been responsible for 5 patients, he/she would take 3 additional patients from the "off" intern). This means the covering intern needs to pre-round, present on rounds, write notes, signout, and be responsible for follow-up of all of these patients. When the service is busy, the NP, CHF fellow, and attending will cover additional patients beyond the 8 that will be covered by the intern.

--On clinic days, interns should arrive early enough (while still observing the work hours restrictions of 10 hours off between shifts) to have pre-rounded and completed notes by the start of rounds (variable, but often 8:30A). The clinic intern's patients will be rounded on first (assuming afternoon clinic), so that there is adequate time for most orders and consults to be done by the time the intern leaves for clinic. The intern leaving for clinic should signout all of their patients to their co-intern before leaving for clinic, including any remaining patient care issues. At the end of clinic, the intern should communicate by phone with their co-intern and/or HF NP for updates on their patients and outstanding follow up issues for the following day. If the CHF service is busy and the intern clinic is geographically close to UCH, the intern may need to return to the hospital to follow up on outstanding issues.

UCH HF & Cardiac Transplantation Fellow Responsibilities

Educational Goals:

1. Care of patients with heart failure (HF):
    a. Develop skills in the appropriate assessment including history, physical exam, and appropriate diagnostic testing of patients with advanced HF.
    b. Become proficient in the management of patients with advanced HF, including inpatients requiring invasive, hemodynamic monitoring, inotropic support, cardiac resynchronization therapy, implantable defibrillators, peripheral mechanical support (e.g. intra-aortic balloon pump), and end-of-life decisions.
2. Care of patients considered for, before, during, and after cardiac transplantation:
    a. Develop experience in the evaluation of HF patients as potential cardiac transplantation recipients. Become familiar with the indications and contraindications for cardiac transplantation.
    b. Develop skills in the appropriate assessment including history, physical exam, and appropriate diagnostic testing of patients following cardiac transplantation.
    c. Gain experience in the evaluation and management of post-operative cardiac transplant patients.
3. Care of patents considered for, during, and after ventricular assist device therapy (VAD) / mechanical circulatory support (MCS) placement:
    a. Develop skills in the appropriate evaluation of patients considered for both short-and long-term MCS including bridge to transplantation and destination therapy.
    b. Become familiar with the assessment and management of patients with various VAD/MCS devices.
4. Demonstrate competency in the 6 ACGME core required areas of (1) patient care (which includes medical interviewing, physical examination and procedural skills), (2) medical knowledge, (3) practice-based learning and improvement, (4)

interpersonal and communication skills, (5) professionalism, and (6) systems-based practice.

These educational goals and objectives will be accomplished with the following daily responsibilities:

1. Round on the HF Primary Service* (inpatients, CCU patients).
2. Consult on HF, MCS, and transplantation patients not on the primary HF service.
3. Attend administrative meetings related to the service (bi-monthly cardiac transplantation listing conference, monthly MCS meeting, and ad-hoc meetings), including the presentation of patients to the committee.
4. Participate in follow-up of HF and cardiac transplantation research patients.
5. Place Swan-Ganz catheters, temporary pacing wire, and other procedures in the CCU.
6. Dictate cardiac transplantation evaluation letters and insurance approval letters.
7. Participate in HF Clinic on Tuesday, Thursday and Friday mornings, the Cardiac Transplantation Clinic on Wednesday mornings, and the VAD Clinic Monday mornings when needed / as patient care issues arise, or when the inpatient / consult service census is low.
8. Arrange and perform cardioversions.
9. Coordinate and perform housestaff education.
10. Attend all educational programs for fellows, specifically Grand Rounds, Journal Club, Cath Conference, ECHO Conference and Research Conference.
11. Participate in some scholarly activity related to advanced heart failure. This can be accomplished through any of the following:
    a. Provide peer review with one of the attendings for a manuscript submission to a scholarly journal.
    b. Design, institute, complete and submit for publication a case report or an individual research project.
    c. Present a recent article at one of the advanced HF group meetings or provide an educational presentation to the advanced HF team.
    d. Other scholarly activity agreed upon with a HF attending.

*Rounding expectations for HF fellow on service (weekday and weekend the same):

- First thing in the morning, the HF fellow will verbally touch base with the on call housestaff from the night before to identify important events and evolving management issues. The on-call fellow from the night before is responsible for contacting the daily HF fellow if there are relevant clinical issues to discuss.
- The HF fellow will generally be expected to see patients and leave notes before attending rounds.
    - The HF fellow should **pre-round on all patients who are unstable, patients who require timely management decisions, CCU HF patients, and active consults**.
    - **If there are less than 8 consults and CCU patients, fellows should see additional inpatients**.
    - The HF fellow should **write a complete note on the patients on other services (consults)**, including all components of a complete note with a commitment to a plan of action. The HF fellow should write an **abbreviated note consisting of a brief summary assessment followed by primary management decisions for patients on the HF service (for whom the housestaff are writing a complete note)**.
    - If an intern and the NP are off, the covering intern will round on 8 primary HF patients. The HF fellow may need to pre-round and write complete notes on the remaining patients if the primary HF service census is >8 patients.

- The HF fellow will actively participate in attending rounds.
- The HF fellow will be available to assist with ongoing patient management, discharges, new admissions, procedures, and house officer education throughout the day.
- The HF fellow is expected to be the first contact for patient questions and decision making for the HF interns and NP.
- If covered by another fellow for the evening or weekend, the HF fellow will sign out to the on-call fellow in a timely and complete fashion.
- The HF fellow is expected to sign out all patients in the CICU or other patients with active issues every evening to the on-call cardiology fellow. This can be done by telephone.
- The HF fellow is expected to work effectively as a leader of the health care team; specifically, the fellow should demonstrate the ability to run rounds, direct patient care, and educate other heath care professionals.

In order to meet these educational and patient care responsibilities, fellows can expect the attending of record to adhere to the following expectations as well:

- The attending will be available and involved in patient management, providing thorough supervision of patient care.
- The attending must respect work hours and structure the service to conform to work hour requirements. If necessary, attendings should take care of management by themselves rather than cause work hour violations.
- The attending should encourage HF fellow autonomy and maximal participation in care once the fellow has demonstrated appropriate competencies.
- The attending will provide appropriate quality teaching for both fellows and housestaff.
- The attending will set an example of professionalism.
- The attending will provide ongoing feedback to the fellow and the housestaff.

Faculty Director: Brian Lowes, M.D.
Date: 8/2010

I. **Educational Purpose and Goals**

Management of hospitalized patients remains essential for the practice of cardiovascular medicine. The heart failure-transplant cardiology rotation at University of Colorado Hospital allows residents to refine history and physical exam skills, develop experience in selection of diagnostic tests and learn management of a wide variety of diseases. These experiences provide exposure to common medical problems of hospitalized patients and allow residents opportunities to develop discharge care plans. Additionally, residents are exposed to uncommon medical conditions and have the opportunity to interact with subspecialists while managing patients with complex conditions. This rotation provides internal medicine residents with direct experience in history and physical exam skills with attention to the cardiovascular system, the selection and interpretation of common diagnostic tests (ECG, echocardiogram, nuclear cardiac imaging, cardiac MRI, and cardiac catheterization), and management of a variety of diagnostic investigations and management of acute and chronic cardiovascular diseases in the setting of an intensive and coronary care unit, an intermediate or "step-down" unit, and a cardiac telemetry unit. The rotation focuses on heart failure and transplant cardiology but in addition to these areas, encompasses general cardiology with exposure to all aspects of acute cardiovascular disease (i.e. atrial fibrillation, acute coronary syndromes, syncope, endocarditis,

decompensated valvular heart disease, pericardial disease, and adult congenital heart disease) as well as general internal medicine. These residents are under direct supervision by board certified cardiologists that are also UNOS-certified in transplant cardiology. All residents will gain experience and exposure in evaluating and managing cardiac cases including interactions with other specialties involved in the management team. Interaction between residents and fellows is designed to enhance the educational experiences at various levels of training in medicine. Currently there are no medical students on this rotation. Residents are also taught the critical concept of team care in the in-patient environment with the central role of nursing, consultative services, social services, and a variety of other groups involved in the process of care. Finally, a major goal of the rotation is for residents to understand the principles of evidence-based medicine, the large repository of randomized clinical trials that guide cardiovascular care, and the use of guidelines, pre-printed orders for specific cardiovascular syndromes, and the metrics of quality of care in the hospital setting.

II. **Principal Teaching Methods**

Residents work directly with the cardiology fellow and attending cardiologist on the inpatient Heart Failure/Transplant Cardiology Service to obtain a focused problem-based history and physical examination on acutely ill cardiac patients. There is a separate cardiology fellow and attending cardiologist for each component of the inpatient cardiology experience, one for the general service and one for the Heart Failure and Transplant Service. They formulate an appropriate management plan which includes various noninvasive and invasive diagnostic studies as well as treatment plans that include medical therapy (including intravenous vasoactive and inotropic medications), device therapy (including cardiac resynchronization therapy, implantable cardioverter-defibrillator), advanced heart failure therapy (mechanical circulatory support and cardiac transplantation) as well as indications and management/complications of these advanced therapies. This management approach includes a review of relevant testing requests and their frequency as well as medication therapy, documenting all findings in the medical record. The resident is expected to discuss significant findings with the sub-specialty fellow and attending physician. The resident will attend rounds on all heart failure/transplant cardiology patients with the sub-specialty fellows and attending physicians. They will prepare and present cases including appropriate literature references and all pertinent patient related data, and are expected to review and be prepared to discuss relevant literature references.

Specific Teaching Methodology:

a. Bedside teaching/management rounds are conducted on a daily basis with the Heart Failure/Transplantation attending and fellow incorporating teaching through supervised direct patient care activities during these management rounds. Bedside teaching includes refinements in taking a cardiac history, demonstration of an array of abnormal cardiovascular physical findings including auscultory abnormalities and jugular vein assessment, and interpretation of invasive hemodynamic monitoring parameters and waveforms.

b. Supervised Direct Patient Care teaching occurs throughout the workday during subspecialty fellow/internal medicine resident interactions. Sub-

specialty fellows in Cardiology are held responsible for teaching rotating residents and insuring that these individuals are provided with a high quality rotation.

c. Supervised Procedures – Residents are required to have direct supervision of all invasive procedures such as central line placement and cardioversion. This supervision is provided by either the cardiology fellow or attending cardiologist depending on the nature and risks of the procedure.

d. Didactic Lectures and Small Group Discussions are included through

i. Teaching Rounds – a component of daily rounds, these rounds consist of either case-based discussions addressing the pathophysiology, diagnosis, and treatment of various cardiovascular disease processes with a focus and short-term and long-term outcomes of a given therapy. This involves the review and interpretations of standard ECG's on all patients. Furthermore cardiovascular blood tests such as cardiac markers, lipid profiles, and anticoagulation assessment are reviewed and discussed as to interpretation. In addition, didactic information is also provided utilizing either material from textbooks or from recent relevant medical literature. Residents are also provided reprints or photocopies of pertinent, clinically relevant articles. These are conducted by assigned cardiology faculty who acts as the teaching attending for a 1-2 week period. The cardiology fellows also arrange additional didactic time to review pertinent diagnostic and therapeutic aspects of the management of cardiovascular diseases. An integral part of this learning experience involves the use of appropriate literature references and case review methods as noted above.

ii. Cardiology Grand Rounds and Cardiac Catheterization Conferences - Typically, these are either case reviews and/or topics of interest present by guest speakers.

e. Assigned Readings are based on materials provided during teaching rounds supervised by the attending and the subspecialty fellows.

f. Required Presentations - All sub-specialty fellows and rotating residents participating in this rotation are expected to present during the above teaching rounds. Rotating residents usually present cases pertinent to either new admissions or issues related to patients on the services. Rotating residents are also required to present cases at the daily Morning Report, a conference which includes rotating residents on all the inpatient Internal Medicine rotations at University of Colorado Hospital. Cardiology fellows are expected to present pertinent information from the medical literature on cardiovascular disease management.

g. Image review sessions – Rotating residents as well as specialty fellows have attending directed reviews of patient's cardiovascular imaging studies including echocardiography, angiography, cardiac CT, cardiac nuclear, and cardiac MR studies. Often these reviews are with specialists in these fields.

III. Educational Content

a. Mix of diseases

i. Heart failure patients (whose etiologies include ischemic, familial, valvular, drug induced, and congenital) and post-cardiac transplantation patients admitted to the hospital for a variety of

diagnoses make up the composition of the rotation. During the month rotation it is common for residents to have patients with decompensated heart failure, acute coronary syndromes, out of hospital cardiac arrest, ventricular arrhythmias/ICD shocks, new onset atrial fibrillation with rapid ventricular response, complete heart block, endocarditis, aortic stenosis, hypertrophic cardiomyopathy with obstruction, pericardial pathology, syncope of unknown etiology, and a variety of other disorders. Many of the transplant patients are also admitted with a variety of unique conditions related to immunosuppressive therapy including atypical infections and malignancy. Many of these patients have a variety of comorbid diseases such as systemic hypertension, diabetes mellitus, lipid abnormalities, and anemia requiring a broad internal medicine approach. Management of these chronic disorders/predilections are combined with diagnosis and management of acute conditions requiring hospitalization.

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b. Patient characteristics

i. Patients admitted to the Heart Failure and Transplantation Service are patients followed in the University of Colorado Hospital Heart Failure or Transplant Cardiology clinic and have cardiovascular symptoms and signs that required management and are housed in the ICU or CCU, the intermediate care unit, or the cardiac telemetry unit of University of Colorado Hospital. Many of these patients are those with severe complex heart failure being considered for cardiac transplantation, device intervention (IABP or LVAD), or prolonged intravenous inotropic therapy. Patients admitted to the Cardiac transplant patients are usually admitted for the treatment of cardiac rejection, infection, or other complications of cardiac transplantation and its associated therapy.

ii. These patients will be of both gender types and of a wide spectrum of socioeconomic backgrounds. Patients are either admitted from the Emergency Department ,from subspecialty clinics of the hospital, transferred from community hospitals from the Rocky Mountain region, or admitted following therapeutic procedures in cardiac catheterization laboratory and electrophysiology laboratory.

c. Learning venues: Type of clinical encounters, procedures and services

i. Attending physicians involved in staffing the Heart Failure and Transplantation services are ABIM certified in cardiovascular disease, UNOS certified in transplant cardiology, and will be ABIM certified in Advanced Heart-Transplant Cardiology when this becomes available in late 2010. There is also a general cardiology fellow, an advanced heart failure-transplant cardiology fellow, and an inpatient nurse practitioner on the service. There are currently two PGY-1 internal medicine residents on the service.

ii. The Intensive Care Unit/CCU, the intermediate care unit, and the cardiology telemetry units at University of Colorado Hospital will be the principal training sites, providing modern equipment and skilled nursing and technical support available to patients with a variety of cardiovascular diseases. The degree of severity of illness will determine the location of the patients on the cardiology

services. Sub-specialty fellow and rotating internal medicine have the resources available to provide the highest quality care to acutely ill cardiac cases. Patients will be admitted to the Heart Failure-Transplant Cardiology Service by members of the team, referrals from other services or via Emergency Department contact.

iii. The rotation is 100% inpatient, with the exception of mandatory resident participation in their weekly internal medicine continuity clinic.

iv. ECG and chest Xray interpretation skills are taught, and invasive and noninvasive cardiac procedures are introduced including echocardiogram interpretation, cardiac catheterization, defibrillator implantation, pacemaker evaluation, and selection for intra-aortic balloon pump, mechanical circulatory support/ventricular assistance devices. In addition, pre-transplantation evaluation, heart failure evaluation and management, and arrhythmia management are emphasized.

v. A special effort is made to enhance the knowledge of cardiovascular pharmacology during both formal rounds and informal bedside teaching. A pharmacist from the School of Pharmacy attends the daily Teaching and Patient Management Rounds and participates in the teaching process.

vi. . Ancillary Services and Consultative services: Residents learn the use of special consultative services from such groups as Interventional Cardiology, Cardiac Electrophysiolgy, Cardiac Surgery, Vascular Surgery, Infectious Disease, Nephrology, and Genetics. The use of special ancillary services is also incorporated into the rotation including cardiac rehabilitation, palliative care, social services, and chaplain services.

d. Structure of rotation

i. Residents are not on call during this rotation. They take daily admissions from 7am to 5pm during the week and 7am to noon on weekends. They should routinely be able to leave the hospital by 7pm. If they in rarely need to stay later than 7pm, the inpatient attending will ensure that the resident is given at least 10 hours duty free off between shifts. The residents will comply with duty hours regulations with a maximum of 80 work hours per week averaged over four weeks and they will have one 24-hour day in 7 free from duty, averaged over four weeks. The residents will admit no more than 5 admissions per any given 24 hour time period. The residents will pick up any heart failure-transplant cardiology admission from evenings/overnights from the on-call general cardiology resident in the morning. These patients will count toward the 5 admissions per day cap per resident.

ii. Residents are responsible for appropriate sign-out to the on-call team. This sign out is accomplished by computerized sign out with written documentation of clinically-relevant issues.

vii. The residents are also responsible for documenting/dictating daily progress notes as well as discharge summaries on all patients on their team.

viii. There is a cardiology fellow on call for both the general

cardiology and Heart Failure and Transplantation services at all times for supervision and support for the rotating housestaff team. Additionally consultative support is available for an on-call Electrophysiology and interventional fellow.

ix. Residents will continue to attend their weekly medicine continuity clinic during this rotation, being excused one afternoon a week.

x. Typical weekly conference schedule:

Mon	Tues	Wed	Th	Fr	Sa/Su
8:30-10:30 AM Teaching and Patient Care Rounds 11:00-noon Morning Report 4-5PM Didactic teaching & signout rounds	8:30-10:30 AM Teaching and Patient Care Rounds 11:00-noon Morning Report 4-5PM Didactic teaching & signout rounds	8:30-10:30 AM Teaching and Patient Care Rounds Noon-1pm Internal Medicine Grand Rounds 4-5PM Didactic teaching & signout rounds	8:30-10:30 AM Teaching and Patient Care Rounds 11:00-noon Morning Report 4-5PM Didactic teaching & signout rounds	8:30-10:30 AM Teaching and Patient Care Rounds 11:00-noon Morning Report Noon-1PM Cardiology Grand Rounds 4-5PM Didactic teaching & signout rounds	8:30-10:30 AM Teaching and Patient Care Rounds

IV. Principal Ancillary Educational Materials

a. Residents have access to standard cardiology texts and journals onsite at the medical housestaff library, and through 24-hour online Denison library access. All residents are encouraged to read primary literature extensively throughout the rotation and they are routinely given articles pertinent to patient case discussions or didactic lecture material.

V. Methods of Evaluation

a. Resident Performance:
Faculty will complete web-based electronic resident evaluation forms provided by the Internal Medicine Residency office. The evaluation is competency-based, fully assessing core competency performance. The evaluation will be shared with the resident, is available for on-line review by the resident at their convenience, and is sent to the residency office for internal review. The evaluation will be part of the resident file and will be incorporated into the semiannual performance review for directed resident feedback.

b. Program and Faculty Performance:
Upon completion of the rotation, the residents will be asked to complete a service evaluation form commenting on the faculty, facilities, and service experience. These evaluations are conducted by the Chief Medical Resident in a conference-type format. These evaluations will be sent to the residency office for review and the attending faculty physician will receive anonymous copies of completed evaluation forms within several weeks of

the completion of the clinical rotation. The Housestaff Education Committee will review results annually.

VI. Institutional Resources: Strengths and Limitations

a. Strengths - The faculty of the Cardiovascular Division are full-time members of the School of Medicine and include nationally recognized experts in a variety of areas within cardiovascular medicine. Many have received teaching awards and are the authors of textbooks, chapters, and lecture in regional, national, and international conferences. The residents will encounter a wide variety of presentations of the most common serious cardiovascular complaints and conditions as well as an introduction to extremely complex patients requiring advanced cardiac care such as special cardiac intervention procedures for coronary/pericardial/valvular/adult congenital heart disease, cardiac assist devices, advanced electrophysiologic therapy, and cardiac transplantation. They will be introduced to a variety of testing modalities and therapeutic interventions.

b. Limitations - The residents are busy as these patients are challenging and complex. Several of these patients are critically ill and may have been referred from other regional cardiologists for consideration of advanced heart failure therapies, and the residents may find it difficult to come up with diagnostic and therapeutic plans for these patients. For patient safety, more direct hands-on supervision by the attending and fellow on service is needed which may limit resident autonomy for these patients.

VII. Rotation Specific Competency Objectives:

By the conclusion of this rotation the resident will:

a. Patient Care
   i. Demonstrate the ability to provide a problem focused history and physical examination.
   ii. Demonstrate reinforced skills in cardiopulmonary resuscitation, phlebotomy, central line placement/indications, hemodynamic monitoring, and indications for cardiac imaging and procedures.
   iii. Demonstrate increased ability in the assessment and management of critically ill cardiac patients including formulation of a working diagnosis and plan.
   iv. Review studies, data and procedural notes to more effectively manage patients.
   v. Provide clear and concise documentation in the medical record.

b. Medical Knowledge
   i. Demonstrate knowledge of fundamental approaches to the evidence-based care of acute coronary syndromes, congestive heart failure, unstable arrhythmias, evaluation for cardiac transplantation, and other cardiovascular problems.
   ii. Demonstrate knowledge of fundamental elements of cardiac anatomy, physiology and pharmacology, as well as the manifestations of common forms of cardiac pathophysiology through the cardiac physical exam.
   iii. Correctly interpret common electrocardiographic findings including:
      1. atrial and ventricular rates
      2. common regular and irregular rhythms

3. p wave axis and morphology
4. QRS axis and duration
5. P-QRST morphology including patterns for hypertrophy, conduction delays, ischemia, pericarditis, electrolyte abnormalities, and common drug effects

c. Interpersonal and Communication Skills
   i. The PGY1 resident participating in this rotation will be under the supervision of a specialty fellow and attending physician
   ii. Follow assigned patients while under the direct supervision of a specialty fellow and attending physician, interacting productively in a team care approach.

d. Professionalism
   i. Reflect compassion, commitment, integrity, and responsibility throughout his/her interactions.
   ii. Reflect sensitivity to patients of all ages, genders, religious, ethnicities, and sensitivity to the dignity of critically ill and/or terminal patients.

e. Practice Based Learning and Improvement
   i. Demonstrate improving ability to access and critically appraise cardiac literature appropriate to the care of patients, discussing such information as appropriate during the course of cardiology attending rounds case discussions and at Morning Report.
   ii. Assist in the achievement of performance improvement projects and goals identified by the cardiology services, including current projects targeting the care of patients with myocardial infarction and acute coronary syndromes (American Heart Association's Get with the Guidelines Program).

f. Systems Based Practice
   i. Work as an integral part of the health care team including appropriate transfer of care.
   ii. Demonstrate patient advocacy and sensitivity to family interactions during any discussions of terminal care decisions for critically ill patients.
   iii. Demonstrate ability to interact with nurses, physician assistants, catheterization lab technicians, and all other ancillary professionals for total care of cardiac patients.

This document is adapted from the MSU Internal Medicine Residency Program curriculum.