

**Goals, Objectives, and Competencies**  
of  
**The University of Florida Interventional Cardiology Fellowship Training Program**  
**2007-2008**

This document outlines the **goals and objectives** for the interventional fellow/fellowship in the context of the *ACGME Competencies* and should be reviewed by the fellow throughout the training year. Questions should be directed to the program director. These goals, objectives, and competencies are applicable to the interventional cardiology training program at Shands Teaching Hospital, the VAMC, and Leesburg Regional Medical Center.

For each goal and objective, learning activity, or learning opportunity, the ACGME competencies most associated with that activity are listed, as are potential ways in which competency can be evaluated. Abbreviations (as listed below) are used to save space and simplify reading. In reality, almost every activity likely involves every one of the competencies.

***“Every competency can be taught with every patient.”*** -Facilitator’s Manual. Practical Implementation of the Competencies. ACGME. April, 2006, p.7.

**THE ACGME COMPETENCIES**

**Medical Knowledge (MK)**

Interventional cardiology fellows must demonstrate knowledge about established and evolving biomedical, clinical, epidemiological, and social-behavioral sciences and the application of this knowledge to patient care.

Fellows are expected to:

- 1) Demonstrate an investigatory and analytic thinking approach to clinical situations.
- 2) Know and apply the basic and clinically supportive sciences which are appropriate to their discipline.

**Patient Care (PC)**

Interventional cardiology fellows must be able to provide patient care that is compassionate, appropriate, and effective for the treatment of health problems and the promotion of health.

Fellows are expected to:

- 1) Communicate effectively and demonstrate caring and respectful behaviors when interacting with patient and their families.
- 2) Gather essential and accurate information about their patients.
- 3) Make informed decisions about diagnostic and therapeutic interventions based on patient information and preferences, up-to-date scientific evidence, and clinical judgment.
- 4) Develop and carry out patient management plans.
- 5) Counsel and educate patients and their families.
- 6) Use information technology to support patient care decisions and patient education.
- 7) Perform competently all medical and invasive procedures considered essential for the area of practice.
- 8) Provide health care services aimed at preventing health problems or maintaining health.
- 9) Work with health care professionals, including those from other disciplines, to provide patient-focused care.

### **Professionalism (PF)**

Interventional cardiology fellows must demonstrate a commitment to carrying out professional responsibilities, adherence to ethical principles, and sensitivity to a diverse patient population.

Fellows are expected to:

- 1) Demonstrate respect, compassion and integrity.
- 2) Demonstrate a commitment to ethical principles.
- 3) Demonstrate sensitivity and responsiveness to patients' culture, age, gender and disabilities.

### **Interpersonal and Communication Skills (IPC)**

Interventional cardiology fellows must be able to demonstrate interpersonal and communication skills that result in effective information exchange and teaming with patients, patients' families, and professional associates.

Fellows are expected to:

- 1) Create and sustain a therapeutic and ethically sound relationship with patients.
- 2) Use effective listening skills and elicit and provide information using effective nonverbal, explanatory, questioning, and writing skills.
- 3) Work effectively with others as a member or leader of a health care team or other professional group.

### **Practice-Based Learning and Improvement (PBLI)**

Interventional cardiology fellows must be able to investigate and evaluate their patient care practices, appraise and assimilate scientific evidence, and improve their patient care practices.

Fellows are expected to:

- 1) Analyze practice experience and perform practice-based improvement activities using a systematic methodology.
- 2) Obtain and use information about their own population of patients and the larger population from which their patients are drawn.
- 3) Locate, appraise, and assimilate evidence from scientific studies related to their patients' health problems.
- 4) Apply knowledge of study designs and statistical methods to the appraisal of clinical studies and other information on diagnostic and therapeutic effectiveness.
- 5) Use information technology to manage information, access on-line medical information; and support their own education.
- 6) Facilitate the learning of students and other health care professionals.

### **Systems-Based Practice (SBP)**

Interventional cardiology 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.

Fellows are expected to:

- 1) Know how types of medical practices and delivery systems differ from one another, including methods of controlling health care costs and allocating resources.
- 2) Practice cost effective health care and resource allocation that do not compromise quality of care.
- 3) Advocate for quality patient care and assist patients in dealing with system complexities.
- 4) Partner with health care managers and providers to assess, coordinate, and improve health care and know how these activities can affect system performance.

## **Learning Activities and Evaluation Methods**

The interventional Training Program provides learning opportunities in each competency domain and uses multiple assessment methods to evaluate and ensure fellow competence in each area.

Learning activities include:

- On-the-job learning of procedural skills in the cardiac catheterization laboratory
- Didactic lectures
- Various conferences
- Role-modeling and mentoring by faculty
- Discussion with faculty
- Review of cardiac catheterization images with faculty
- Review of cardiac and vascular treatment devices with faculty
- Evaluation of patients in multiple settings
- Discussion with patients and families
- Interaction, discussion with other healthcare workers and teachers
- Extramural conferences and training courses
- Web-based curricula and educational tools
- Live case courses
- Medical simulation experiences/Procedural workshops
- Board review
- Literature review
- Fellows as teachers

Assessment/evaluation methods include:

- Direct observation by faculty (DO)
- 360° or Multisource Professional Feedback (360)
- Case logs (Log)
- Self evaluation forms and self-assessment tools (i.e. CathSapII, Board Review questions, web-based programs). (SE)
- Regular and timely feedback from program director including semiannual written evaluations. (PD)
- ABIM board exam (ABIM)
- Medical Simulation experiences. (Sim) [Note: No financial support is available for Medical Simulation resources to be obtained by UF Division of Cardiovascular Diseases or Shands Cath Lab, so these opportunities are not available on a day-to-day basis in our program. Participation in medical simulation exercises at outside courses and those provided by industry are encouraged.]
- Chart review of fellows' notes, reports and other documentation by faculty (Rev)
- Morbidity and Mortality Review/Quality Assurance Conference (MM)

The UF interventional cardiology fellowship of comprised of:

1. Cardiac Catheterization Laboratory Experience and Procedural Techniques
2. Outpatient Clinic
3. Consultative Services
4. Inpatient Service (MCI)
5. Research
6. Conferences
7. On-Call Experience
8. Independent Reading and Studying
9. Discussion and Interaction with faculty and other fellows
10. Extramural Conferences and Training Programs

As is expected of interventional cardiologists in “real world” practice, these experiences occur simultaneously throughout the interventional fellowship year. This allows the fellow to participate in all aspects of the care of a wide variety of interventional cardiovascular patients including pre-procedural assessment, diagnostic and interventional therapeutic procedures, post-procedural care in the hospital and long-term, and in research relative to the field. As the fellow learns and gains experience, it is expected that he/she will integrate this knowledge and finesse to become a complete, well-rounded, competent interventional cardiology consultant.

### **Schedule**

The interventional fellow will spend 3-4 days per week in the cardiac catheterization laboratories at Shands Teaching Hospital (STH) the Veterans Administration Medical Center (VAMC) and/or Leesburg Regional Medical Center(LRMC) participating in diagnostic procedures and coronary and peripheral vascular therapeutic interventional procedures. ½ day per week will be spent in the outpatient clinic of one of the interventional cardiologists. The other half of the clinic day will be devoted to research. Should the fellow become involved in a research project that requires more time, one additional day may be devoted to research with three days in the cath lab, or other arrangements can be made for protected research time.

Note: The curriculum, policies and procedures, organization and lines of responsibility, and other information regarding the University of Florida (UF) Interventional Cardiology Fellowship Training Program is completely outlined elsewhere in the document *Fellowship Training Program in Interventional Cardiology*. The fellow is also referred to the UF and ACGME documents entitled *Program Requirements for Residency Education in Interventional Cardiology* ([www.acgme.org](http://www.acgme.org)). These documents are provided to the fellow at the beginning of the fellowship year and should serve as the main guide for his/her educational experience at UF throughout the year.

## Goals, Objectives, and Competencies for the Interventional Cardiology Laboratory Experience

- A. During the pre-procedural assessment and care of the patient, the fellow should strive to:
1. Assess and understand the indications and contraindications, and the potential benefits and risks, of vascular diagnostic and interventional procedures.  
Competencies: MK, PC, PBLI  
Evaluations: DO, 360, SE, Rev
  2. Assess and understand the suitability of the patient for the procedure.  
Competencies: MK, PC, PBLI  
Evaluations: DO, 360, SE, Rev
  3. Assess and understand the type of procedure indicated for the patient.  
Competencies: MK, PC, PBLI  
Evaluations: DO, 360, SE
  4. Assess and discuss the patient's perception of the procedure.  
Competencies: PC, PF, PBLI, SBP  
Evaluations: DO, 360, SE
  5. Plan the procedure including vascular access, type of procedure, what information is to be gathered during the procedure, equipment, medications (including anticoagulant and antiplatelet agents), potential complications, hemostasis, and anticipated post-procedural care.  
Competencies: MK, PC, PBLI  
Evaluations: DO, 360, SE, Log
  6. Assess and understand the risks and benefits of the procedure and discuss them with the patient and family, and obtain informed consent. Understand informed consent.  
Competencies: MK, PC, PF  
Evaluations: DO, 360, SE
  7. Understand normal and variant coronary anatomy, angiographic techniques, and collection of hemodynamic data.  
Competencies: MK, PBLI  
Evaluations: DO, SE, ABIM, PD
  8. Generate a thorough report regarding the procedure, results, and plan for the patient.  
Competencies: MK, SBP, PC, IPC  
Evaluations: Rev, SE
- B. Procedures.
- The fellow should strive to become technically proficient in all diagnostic and therapeutic vascular interventional techniques. This includes techniques involving:
1. Manipulation of vascular access needles, wires, catheters, and sheaths.  
Competencies: MK, PC, PBLI  
Evaluations: DO, 360, SE, Sim
  2. Obtaining vascular access through various vessels: femoral, radial, brachial, internal jugular, etc.  
Competencies: MK, PC, PBLI  
Evaluations: DO, 360, SE, Sim
  3. Diagnostic cardiac catheterization. Because interventional fellows have already completed a three-year fellowship program in general cardiology, they are expected to be relatively proficient in techniques of diagnostic catheterization. However, the interventional year does provide the interventional fellow with many opportunities for further experience in diagnostic procedures. The fellow should be able to perform coronary angiography of normal and variant vessels, obtain

appropriate camera rotation and angulation, and perform the “panning” independently. He/she should be able to perform complete hemodynamic assessment of the right and left sides of the heart and appropriate ventriculography in two views.

Competencies: MK, PC, PBLI

Evaluations: DO, 360, SE, Sim

4. Cannulation of coronary and other arteries (renal, carotid, subclavian, iliac, etc.), and bypass grafts with appropriate guiding catheters. The fellow should strive to understand the differences in various catheters and the indications for and features of each.  
Competencies: MK, PC, PBLI  
Evaluations: DO, 360, SE, Sim, Log
5. Gaining access to the target artery with a guidewire. The fellow should strive to understand differences in various wires and the indications for and features of each.  
Competencies: MK, PC, PBLI  
Evaluations: DO, 360, SE, Sim, Log
6. Angioplasty balloons. The fellow should understand the differences in various balloon types, lengths, sizes, and brands, and the indications for and features of each. He/she should learn the techniques of over-the-wire and monorail systems including catheter advancement, tracking, inflation, deflation, and withdrawal. The fellow should learn to determine what size balloon a vessel/lesion will accommodate/require. The fellow should learn to anticipate and solve problems involved with balloon angioplasty procedures. The fellow will learn the technique of “kissing balloons” and other double balloon techniques used for treating vascular disease. He/she should understand the limitations and complications of balloon angioplasty.  
Competencies: MK, PC, PBLI  
Evaluations: DO, 360, SE, Sim, PD, Log
7. Stents. The fellow should understand the differences in various stent types, materials, lengths, sizes, brands, and delivery devices. He/she will learn the techniques of over-the-wire and monorail systems; and balloon-mounted and self-expanding stents including catheter advancement, tracking, stent delivery, and catheter withdrawal. He/she will learn about associated techniques of pre-dilatation and post-dilatation and appropriate choice of these devices. The fellow will learn techniques for removal of undelivered stents. The fellow will learn appropriate sizing of stents and should learn to anticipate and solve problems involved with stenting. He/she will learn techniques regarding “jailing” of vessels, precise stent placement, stenting ostial and bifurcation lesions, stenting dissections, and stenting small vessels and bypass grafts. The fellow will learn indications and contraindications for stenting, and should understand the limitations and complications of stenting (and other interventional procedures) including acute thrombosis, subacute stent thrombosis, and restenosis, and potential preventive and therapeutic strategies.

The interventional fellow should read the available literature and seek out information regarding drug eluting stents. He/she should understand the concepts of polymer coatings and local drug delivery. The fellow should strive to learn the pharmacodynamics, the effects on restenosis and vascular endothelial function, and the side effects and complications of the various drugs, as well as the mechanical and practical features of the various stents. He/she should understand the concept of avoiding vessel injury at the ends of the stent, and the concept of delayed endothelialization.

The fellow should learn the indications and contraindications for use of a covered stent, how to deliver it to the affected area, and how to retrieve and remove an undeployed stent if necessary. The fellow should understand the similarities and differences between covered stents and other types of stents, approved and potential uses of the covered stents, and complications of their use.

Competencies: MK, PC, PBLI

Evaluations: DO, 360, SE, Sim, PD, ABIM, Log

8. Rotational atherectomy (Rotablator®). The fellow should learn the components of the Rotablator device, how the device is assembled, and how it functions. He/she should understand for which types of lesions this device is indicated, and for which types of lesions and vessels it should not be used. The fellow should learn how to use the device to treat coronary arterial lesions including how to platform it, advance it, activate and manipulate it, and dyneglide (remove) it. He/she should understand the use of various speeds (rpm's). He/she should understand hemodynamic changes in the patient related to the use of the device and how to treat them. He/she should understand the complications associated with the use of the device, and how to prevent, recognize, and treat them. He/she should understand burr sizing; the concept of debulking; using the device as primary treatment and as adjunctive treatment for a lesion; and the concept of burr-to-artery ratio. He/she should understand that the device activates platelets; and that it can induce bradycardia, especially if used in the right coronary artery. He/she should learn preventive and treatment strategies for these effects. The fellow should learn to use the device in treating ostial stenoses, calcified lesions, long lesions, small vessels, bifurcation lesions, and chronic total occlusions. First the fellow should learn to assist with the procedure, then he/she should learn to perform each component of the procedure, and then the fellow should progress gradually to be able to perform the entire procedure with the assistance of only one radiology technologist or completely independently.  
The fellow should meet with the sales representative from the Boston Scientific Company and arrange to take the certification course for the Rotablator device.  
Competencies: MK, PC, PBLI  
Evaluations: DO, SE, Sim, ABIM, Log, PD
9. PercuSurge®, Filterwire® and other distal embolization protection devices. The fellow should understand the indications for the device and how it works. He/she should learn to assemble the device, test it, advance it, inflate the balloon/deploy the filter, perform the intervention, aspirate intravascular debris, and remove the device. He/she should know the potential complications of the device, and how to prevent, recognize, and treat them. He/she should arrange with the attending physician and company representative for appropriate proctoring and documentation of use of the device.  
Competencies: MK, PC, PBLI  
Evaluations: DO, SE, Sim, ABIM, Log, PD
10. Intravascular Ultrasound (IVUS). The interventional fellow should learn the advantages and disadvantages of using intravascular ultrasound. He/she should understand what information may be obtained by use of IVUS. He/she should learn to prep and connect the ultrasound catheter; use the monorail system; advance the catheter; obtain appropriate intravascular ultrasound images; remove the catheter; and store the catheter for another imaging run. He/she should learn to perform the intravascular ultrasound examination by manual pullback and with the automatic pullback device(s). The fellow should learn to record, replay, view, and store the images on the IVUS console, and make vessel and lesion measurements and calculations. The fellow should learn appropriate interpretation of the images, and how to use this data to help him/her treat the patient. He/she should learn how to assess vessel size, lumen diameter and area, lesion morphology and area, and to identify dissections, perforations, vessel branching, and lesion length. He/she should learn to use this tool to enhance decision making regarding treatment of patients.  
Competencies: MK, PC, PBLI  
Evaluations: DO, SE, Sim, ABIM, Log, PD
11. Intracoronary Doppler Flow Velocity Analysis. The interventional fellow should learn the advantages and disadvantages of using the Doppler flow wire. He/she should understand what information may be obtained by the use of the device. He/she should learn how to prepare the device, advance it, obtain and record appropriate images, and remove the device. The fellow should understand the concept of coronary flow reserve (CFR) and how it is affected by administration of different medications and by states of health and disease. The fellow should learn to administer intracoronary adenosine, acetylcholine, and nitroglycerine and determine their effects on the CFR, and how this correlates with microvascular and endothelial function. The

fellow should learn how to interpret the images and the flow reserve data and use this information to appropriately treat the patient.

Competencies: MK, PC, PBLI

Evaluations: DO, SE, Log, PD, ABIM, Sim

12. Intracoronary Pressure Wire Analysis. The interventional fellow should learn the advantages and disadvantages of using the intracoronary pressure wire. He/she should understand what information may be obtained by the use of the device. He/she should learn how to prepare the device, advance it, obtain and record appropriate pressure tracings, and remove the device. The fellow should understand the concept of fractional flow reserve (FFR) and assessment of lesion physiology and significance. The fellow should learn to administer intracoronary adenosine and determine the effect on the FFR, and how this correlates with lesion significance and microvascular function. The fellow should learn how to interpret the images and the flow reserve data and use this information to appropriately treat the patient.  
Competencies: MK, PC, PBLI  
Evaluations: DO, SE, Log, PD, ABIM, Sim
13. Mitral valvuloplasty. The interventional fellow should have a working understanding of mitral valve hemodynamics. The fellow should understand the mitral valve score and how it relates to the severity of mitral stenosis and the suitability of the valve for the valvuloplasty procedure. The fellow should personally review the echocardiograms of all patients undergoing mitral valvuloplasty and have a clear understanding of the mitral valve anatomy and hemodynamics. As with all procedures, the fellow should know the indications and contraindications for mitral valvuloplasty and the potential risks and benefits. He/she should understand and learn the technique of transeptal puncture and visualization of the septum under fluoroscopy and with transesophageal echocardiography. He/she should understand monitoring of the patient throughout the procedure. He/she should learn the techniques of advancing, positioning, inflating, deflating, and removing the Inoue balloon. The fellow should be able to quickly assess the mitral valve hemodynamically, calculate the mitral valve area, and assess the adequacy of the procedure. He/she should know the potential complications of the procedure and strategies for treatment. Similarly, the fellow should learn the same concepts regarding pulmonic and aortic valvuloplasty.  
Competencies: MK, PC, PBLI  
Evaluations: DO, SE, Log, PD, ABIM, Sim
14. Alcohol Septal Ablation for Hypertrophic Cardiomyopathy. The fellow should know the clinical, anatomic, physiologic, echocardiographic, and hemodynamics features of hypertrophic obstructive cardiomyopathy. He/she should personally review the echocardiograms and cardiac catheterization films of all patients undergoing alcohol septal ablation. He/she should know the indications, contraindications, risks, and benefits of the procedure. The fellow should understand the arterial supply to the interventricular septum, and basic techniques of balloon angioplasty. The fellow will learn how to assess adequate balloon inflation, identification and confirmation of the arterial supply to the area of left ventricular outflow tract obstruction, and techniques of injection through the central lumen of a balloon catheter under fluoroscopic and echocardiographic guidance. He/she will learn techniques of alcohol injection and assessment of adequacy of the procedure. He/she will understand monitoring the patient for complications and strategies for treatment. He/she should understand post-procedure monitoring, both short- and long-term. He/she should understand the concept of incomplete procedure and learn strategies for prevention and for re-treatment. The fellow should read the literature regarding this new procedure.  
Competencies: MK, PC, PBLI  
Evaluations: DO, SE, Log, PD, ABIM, Sim
15. Pericardiocentesis. The interventional fellow should know the clinical and echocardiographic features of pericardial effusion and cardiac tamponade. He/she should know the indications, contraindications, and potential benefits and risks of the procedure. He/she will learn how to position, prep, and drape the patient for the procedure with appropriate echocardiographic monitoring in the cath lab. He/she will learn techniques for needle and catheter access to the

pericardium under fluoroscopic and echocardiographic guidance and techniques for drainage of pericardial fluid. The fellow should know how to monitor the patient for complications and strategies for treatment.

Competencies: MK, PC, PBLI

Evaluations: DO, SE, Log, PD, ABIM, Sim

16. Peripheral vascular procedures including femoral, iliac, renal, subclavian, and carotid arteriography and intervention. The fellow will learn the vascular anatomy pertaining to these areas. He/she should understand pre-procedure assessment including ankle-brachial indices, ultrasound, and angiography, and should personally review these studies on each patient. The fellow will learn appropriate angiographic visualization and assessment of these areas. The fellow will learn procedural techniques to treat vascular disease in these areas including balloon angioplasty, stenting, and atherectomy. The fellow will learn the indications, contraindications, and potential benefits and risks of these procedures. He/she will learn techniques of the peripheral vascular angioplasty, stenting and atherectomy as outlined above for coronary procedures.  
Competencies: MK, PC, PBLI  
Evaluations: DE, SE, Log, PD, ABIM, Sim
17. Intraaortic Balloon Pump Counterpulsation (IABP). The interventional fellow will learn the indications, contraindications, benefits, and risks of IABP in emergency and elective situations for treating cardiogenic shock, improving coronary perfusion, and improving cardiac hemodynamics. The fellow should learn the basic principles on which the use of IABP is based and how the device works. The fellow will learn how to assemble the device, introduce it, advance and position it, assess its function and effectiveness, and to remove it. He will learn how to adjust the balloon inflation, deflation, and timing. He should monitor the patient for complications and learn strategies for treatment of complications.  
Competencies: MK, PC, PBLI  
Evaluations: DO, SE, Log
18. Temporary Pacemaker (TPM) Catheters. The interventional fellow will learn the different sizes, types, and brands of temporary pacer wires and their indications and features. He/she should know the indications, contraindications, risks, and benefits of the procedure. He/she should learn how to obtain vascular access (internal jugular, femoral, subclavian vein) for TPM placement; advance, position, test, secure, monitor, and remove the device; monitor the patient for complications; and enact strategies for treatment if complications occur. He/she should learn when permanent pacemaker (PPM) placement is required and when to contact a cardiac electrophysiologist for assistance. The fellow should become familiar with TPM placement under elective and emergency conditions; with and without fluoroscopic guidance; and in the setting of interventional procedures.  
Competencies: MK, PC, PBLI  
Evaluations: DO, SE, Log
19. Vascular closure devices. The interventional fellow will learn the different types of vascular closure devices available, their indications, contraindications, risks, and benefits. He/she will learn how to determine if the vessel is suitable for closure, vascular angiography and assessment, and use of the device. He/she will learn how to assess adequacy of closure, monitor the patient for complications, and enact strategies for treatment if complications occur.  
Competencies: MK, PC, PBLI  
Evaluations: DO, SE, Log, Sim
20. Other devices.  
There are other devices which have been used in the world of interventional cardiology in the past, but are not used very frequently anymore. These include Directional Coronary Atherectomy (DCA), Transluminal Extraction Catheter (TEC), and Laser Atherectomy. These devices are used rarely at the University of Florida and the interventional fellow should scrub on

the case whenever these devices are used. The interventional fellow should read about these devices and discuss their use with the faculty so that he/she has a good understanding of the indications, contraindications, benefits, risks, potential utility, technical manipulation, complications, and costs associated with the use of these devices.

Competencies: MK, PC, PBLI

Evaluations: DO, SE, Log

21. Angiogenesis. The interventional fellow should understand the concept of intracoronary delivery of pharmaceutical agents to enhance angiogenesis. He/she should read about vectors and various agents, have a general understanding of their mechanisms of actions, effectiveness, side effects and complications, and methods of delivery.

Competencies: MK, PC, PBLI

Evaluations: DO, SE, Log, PD, ABIM

22. Emergency/Urgent Procedures.

The interventional fellow should be involved in the care of patients presenting to the Emergency Department and/or to the cardiac cath lab with conditions requiring emergent or urgent evaluation and treatment. He/she should strive to learn as much as possible about and gain experience with patients presenting with:

- a. acute myocardial infarction requiring thrombolytic therapy and/or primary or rescue intervention.
- b. acute coronary syndromes requiring pharmacological therapy and early invasive vs. conservative therapy.
- c. other conditions requiring emergency care such as cardiogenic shock, aortic dissection, massive pulmonary embolism, cardiac tamponade, decompensated heart failure, thrombosed mechanical valvular prosthesis, and mechanical complications of acute myocardial infarction including ruptured papillary muscle with acute mitral regurgitation, ventricular septal defect, and free wall rupture.

Competencies: MK, PC, PBLI

Evaluations: DO, SE, Log, ABIM, Sim, MM

24. The interventional fellow should also learn about the concepts of:

- a. Complete vs. incomplete percutaneous or surgical revascularization.
- b. Advantages and disadvantages of medical vs. percutaneous vs. surgical treatment for various clinical and anatomic situations, especially diabetic patients.
- c. Advantages and disadvantages of different transcatheter therapeutic modalities for various clinical and anatomic situations.
- d. Emergency CABG for the management of complications of PCI.
- e. Thrombolytics vs. primary angioplasty for acute MI.
- f. Radiation physics, biology, and safety.
- g. Surgical MV commisurotomy vs. mitral valvuloplasty.
- h. Surgical myomectomy/MVR vs. alcohol septal ablation for HOCM.
- i. Indications and contraindications for and use of Enhanced External Counterpulsation (EECP) in patients with CAD.

Competencies: MK, PC, PBLI

Evaluations: DO, SE, Log, ABIM

### C. Pharmacological Agents

The interventional fellow has opportunities to use many primary and adjunctive pharmacotherapeutic agents. He/she should strive to learn the indications, contraindications, pharmacology, side effects, effectiveness, and literature regarding the use of various:

1. Thrombolytic agents.
2. Glycoprotein IIb/IIIa inhibitors for ACS and for interventional procedures.
3. Combinations of agents.
4. Anticoagulants including unfractionated heparin, low-molecular-weight heparin, and other anti-thrombin agents (Angiomax® for ACS and in conjunction with interventional procedures).
5. Other antiplatelet agents including aspirin, clopidogrel (Plavix), and ticlopidine (Ticlid) for use in ACS and in conjunction with interventional procedures.
6. Vasodilators (including those for use in the cath lab to evaluate microvascular function, adenosine and acetylcholine), vasopressors, and antiarrhythmic agents.
7. Agents used in the treatment of peripheral vascular occlusive disease such as pentoxifylline (Trental), cilostazol (Pletal), and others.
8. Agents used to treat epicardial coronary arterial and microvascular spasm including nicardipine, nitroglycerine verapamil, nitroprusside, adenosine, etc.
9. Agents aimed at preventing or limiting the occurrence of contrast nephropathy such as acetylcysteine (Mucomyst).
10. Various types of radiographic contrast agents.
11. Agents used to promote angiogenesis.

Competencies: MK, PC, PBLI

Evaluations: DO, SE, ABIM

#### D. Complications

1. The interventional cardiology fellow should learn how to anticipate, avoid, monitor for, recognize, and treat complications of diagnostic and therapeutic interventional procedures. These complications include left main coronary artery dissection, vascular and cardiac perforation, acute vessel closure, vessel dissection, slow-flow or no-reflow phenomena, distal embolization, cardiac tamponade, vessel thrombosis, vessel spasm, cardiogenic shock, retained components, anaphylaxis to contrast, bleeding/hemorrhage, stroke/TIA, incomplete procedure, and restenosis. Vascular access problems/injury, retroperitoneal bleeding, pseudoaneurysm or AV fistula formation, arrhythmias, contrast nephropathy, cholesterol emboli syndrome, and infection can also occur. One of the goals of the interventional program is to educate the fellow in the treatment of these serious and sometimes life-threatening conditions. Experience is the best teacher. The more cases a fellow can do, the more comfortable he/she will be with procedural and monitoring techniques, and the more likely he/she will be to encounter complications and work with the attending interventionalist to treat them. The fellow should discuss each of these complications with the interventional faculty in order to develop a complete understanding of the causes, prevention, early recognition, and therapy of these complications. The fellow should also read interventional textbooks regarding these complications. A new textbook is currently being written which is devoted to the topic of vascular and cardiac interventional procedural complications, edited by Dr. William O'Neal. Publication is expected in February 2008.

Competencies: MK, PC, PBLI, SBP

Evaluations: DO, SE, 360, ABIM, MM, PD

2. Interventional fellows should be proficient in general cardiology which should include the diagnosis and treatment of cardiovascular diseases (including acute myocardial infarction, acute coronary syndromes, arrhythmias, stable angina, heart failure, and congenital and valvular heart disease), ECG interpretation, hemodynamic monitoring, advanced cardiac life support, and cardiopulmonary resuscitation. In addition to maintaining and improving these skills, the interventional fellow should become proficient in IABP placement; pericardiocentesis; use of a perfusion balloon; use of covered stents; use of vasoactive agents for epicardial and microvascular spasm; use of thrombolytic agents, anticoagulants and antiplatelet agents; cardiopulmonary resuscitation; as well as effective and efficient performance of therapeutic interventions in elective and emergency circumstances.

Competencies: MK, PC, PBLI

Evaluations: DO, SE, PD, ABIM

3. Bleeding complications are the most common complications of diagnostic and therapeutic vascular procedures. In addition, patients with vascular disease, ischemia, and those undergoing vascular interventions usually/always receive various antiplatelet, anticoagulant, and/or thrombolytic agents and therefore, are at high risk for serious bleeding complications. The interventional fellow should learn about these antithrombotic agents, about vascular access and complications, and learn how to manage these bleeding problems. He/she should become proficient in the assessment of limb perfusion; clinical suspicion and diagnosis of retroperitoneal bleeding; ultrasound assessment of vascular access sites; manual and mechanical compression of vascular access sites; blood products and pharmacotherapies to reverse antithrombotic agents; use of vascular closure devices; and treatment of hemorrhagic shock. He/she should learn when it is appropriate to obtain surgical consultation. For percutaneous or open surgical repair of vascular complications.  
Competencies: MK, PC, PBLI  
Evaluations: DO, SE, PD, ABIM
- E. Following the completion of the procedure, the fellow should strive to:
1. Assess and understand the success, failure, and/or complications associated with the procedure.  
Competencies: MK, PC, PBLI  
Evaluations: DO, SE, PD, MM
  2. Become competent in interpretation of images and hemodynamic data.  
Competencies: MK, PC, PBLI  
Evaluations: DO, SE, PD, ABIM
  3. Participate fully in the post-procedure care of the patient. Discuss the procedure and its outcome with the patient and family.  
Competencies: PC, PF, IPC  
Evaluations: DO, SE, 360, PD
  4. Learn about report generation and coding and billing procedures.  
Competencies: SBP  
Evaluations: DO, SE, PD
  5. Learn about image processing, storage, and retrieval.  
Competencies: PBLI, SBP  
Evaluations: DO, SE
  6. Discuss the procedure with the interventional faculty and ask questions.  
Competencies: IPC, MK, PC, PF  
Evaluations: DO, SE, PD
  7. Discuss results with the referring physician and answer questions.  
Competencies: MK, PC, PF, IPC  
Evaluations: DO, 360, SE
  8. Formulate plans for follow-up, continued medical therapy, future diagnostic and therapeutic procedures, and/or surgical evaluation.  
Competencies: MK, PC, PF, IPC  
Evaluations: DO, 360, SE, Rev

## Goals, Objectives, and Competencies for the Interventional Cardiology Consult Experience

- A. From his/her previous training, the interventional fellow should already know how to perform H&Ps and interpret most laboratory tests, ECGs, and basic x-rays, as well as echocardiograms, stress tests, and cardiac catheterization hemodynamic and angiographic data. During the interventional fellowship year, he/she should maintain and enhance these skills. The interventional fellow should be particularly capable of obtaining and interpreting cardiac catheterization data. He/she should use the consult experience to learn:
1. The indications and contraindications to various diagnostic and therapeutic vascular procedures.  
Competencies: MK, PC, PBLI  
Evaluations: DO, SE
  2. The appropriate selection of patients for these procedures.  
Competencies: MK, PC, IPC  
Evaluations: DO, SE, 360, ABIM
  3. What questions/problems are to be addressed and the appropriate procedure(s) for the patient. Alternative procedures including medical therapy, surgical intervention(s) and EECF.  
Competencies: MK, PC, IPC  
Evaluations: DO, SE, 360
  4. Appropriate and thorough work-up and preparation of patients for these procedures.  
Competencies: MK, PC, PF, IPC  
Evaluations: DO, SE, 360
  5. How to talk with the patient and his/her family and physicians about the procedure(s), the potential benefits and risks, the potential success and failure, alternative therapies, and appropriate post-procedural expectations.  
Competencies: IPC, PF, MK, PC  
Evaluations: 360, SE, DO, PD
  6. How to obtain complete, appropriate, witnessed, legal, informed consent.  
Competencies: MK, PC, PF, IPC  
Evaluations: SE, 360, DO, Rev
  7. How to document appropriately in the medical record the pre-procedural work-up, procedure, post-procedure care, and follow-up of the patient.  
Competencies: MK, PC, PF, IPC, SBP  
Evaluations: Rev, DO, SE, 360
  8. Planning the procedure including appropriate equipment, medications, and potential problems and strategies for prevention and treatment.  
Competencies: MK, PC  
Evaluations: DO, SE, ABIM, Sim
  9. Assessment/prediction of procedural risk and communication to the patient and his/her family and physicians regarding these risks.  
Competencies: MK, PC, PF, IPC  
Evaluations: 360, SE, DO
  10. Appropriate reporting of results and discussion with consulting physicians, other consultants, and other health care workers caring for the patient.  
Competencies: MK, PC, IPC, PBLI, SBP  
Evaluations: Rev, SE, DO, 360

11. Appropriate follow-up and management of patients immediately after procedures, in-hospital, and long-term.  
Competencies: MK, PC, PF, IPC  
Evaluations: 360, SE, DO, PD
12. Evaluation and management of patients presenting to the Emergency Department or transferred from a referring hospital with acute myocardial infarction requiring thrombolytic therapy and/or primary or rescue intervention.  
Competencies: MK, PC, PF, IPC, SBP  
Evaluations: DO, SE, 360, PD
13. Evaluation and management of patients presenting to the Emergency Department or transferred from a referring hospital with an acute coronary syndrome including pharmacological therapy and early invasive vs. conservative therapy.  
Competencies: MK, PC, PF, IPC, SBP  
Evaluations: DO, SE, 360, PD
14. Evaluation and management of patients presenting with other conditions requiring emergency care such as cardiogenic shock, aortic dissection, massive pulmonary embolism, cardiac tamponade, decompensated heart failure, thrombosed mechanical valvular prosthesis, and mechanical complications of acute myocardial infarction including ruptured papillary muscle with acute mitral regurgitation, ventricular septal defect, and free wall rupture.  
Competencies: MK, PC  
Evaluations: DO, SE, Log, Rev, ABIM, MM
15. Development of collegial relationships with cardiothoracic and vascular surgeons, radiologists, and other physicians.  
Competencies: PF, IPC  
Evaluations: 360, DO, SE

The interventional cardiology consultative experience will occur simultaneously with the fellow's duties in the cardiac cath lab, outpatient clinics, and in-hospital service. The fellow will see consult patients at Shands Teaching Hospital when he/she is on the STH cath lab rotation, at the VAMC while on the VAMC cath lab rotation, and at LRMC while on the LRMC cath lab rotation. The interventional fellow will work and learn directly under the supervision of the interventional cardiology faculty members. There are many opportunities available for discussion and interaction with vascular and cardiothoracic surgeons, interventional radiologists, pediatric interventional cardiologist, and general cardiologists and this interaction is highly encouraged. The interventional fellow should learn a great deal regarding alternative or combined approaches to various problems from these other physicians. Studious reading of cardiology, interventional cardiology, interventional radiology, and surgical journals and textbooks is also highly encouraged.

### **Goals, Objectives, and Competencies of the Interventional Outpatient Clinic Experience**

The interventional fellow will see patients in the outpatient clinic of one of the attending interventional cardiologists ½ to 1 day per week throughout the interventional year and with Dr. Lew in his outpatient clinic when on the LRMC rotation. This population of patients includes patients referred for initial interventional cardiovascular procedures and patients who have previously had procedures, as well as general cardiology patients. This clinic experience provides the fellow with opportunities to:

1. Learn consultative techniques as outlined above for the consultative experience.  
Competencies: MK, PC, PF, IPC, PBLI, SBP  
Evaluations: DO, SE, 360
2. Perform initial evaluation of patients.  
Competencies: MK, PC, PF, IPC  
Evaluations: DO, SE, 360
3. Perform continuous evaluation of patients on a long-term basis.  
Competencies: MK, PC, PF, IPC  
Evaluations: DO, SE, 360
4. Learn and observe the natural history of various vascular diseases.  
Competencies: MK, PC  
Evaluations: DO, SE, ABIM
5. Observe the effectiveness of therapeutic programs, especially interventional procedures.  
Competencies: MK, PC, PBLI, SBP  
Evaluations: DO, SE, ABIM
6. Assume a continuous responsibility for acutely and chronically ill patients.  
Competencies: MK, PC, PF, IPC  
Evaluations: DO, SE, 360
7. Learn to determine when patients require hospitalization.  
Competencies: MK, PC  
Evaluations: DO, SE, ABIM

The interventional fellow should expand his knowledge of cardiovascular diseases beyond that learned during the years of internal medicine and general cardiology training, with emphasis on the evaluation and management of patients requiring cardiovascular interventions.

### **Goals, Objectives, and Competencies of the Interventional In-hospital Service**

The Medicine/Cardiology/Intervention (MCI) service at STH and Dr. Lew's inpatient service at LMRC admit patients to the hospital for evaluation and treatment of cardiovascular diseases which often includes diagnostic and therapeutic interventional cardiovascular procedures. The MCI service is attended by one of the interventional faculty members on a rotational basis, generally for a week at a time. A registered nurse and certified physician assistant or ARNP are also integral parts of this service. The interventional cardiology fellow participates in the care of patients on the MCI service during his/her rotations in the Shands cath lab and care of Dr. Lew's hospital in – patients while on rotation at LMRC. The interventional fellow is responsible for pre-procedure evaluation of the interventional patients, participating in all interventional procedures, and follow-up of the patients after the procedure(s). An interventional faculty member directly supervises all aspects of patient care. By actively participating in the care of hospitalized patients on the MCI service, the interventional fellow should:

1. Learn about the natural history of various cardiovascular diseases.  
Competencies: MK, PC  
Evaluations: DO, SE, ABIM

2. Observe the effectiveness of therapeutic programs, especially interventional procedures.  
Competencies: MK, PC, PBLI, SBP  
Evaluations: DO, SE
3. Perform initial evaluation of all patients who are admitted from the Emergency Department, transferred from a referring hospital or physician's office, or admitted from one of the outpatient clinics.  
Competencies: MK, PC, PF, IPC, SBP  
Evaluations: DO, SE, 360, Rev
4. Perform daily evaluations regarding the progress of the patient during the hospitalization.  
Competencies: MK, PC, SBP  
Evaluations: DO, SE, Rev
5. Assume continuous responsibility for acutely and chronically ill patients.  
Competencies: MK, PC, PF, IPC  
Evaluations: DO, SE, Rev
6. Learn to determine when patients require hospitalization and when they are stable for discharge.  
Competencies: MK, PC, IPC, SBP  
Evaluations: DO, SE, Rev
7. Learn to determine when patients require care in an intensive care unit and other special hospital areas.  
Competencies: MK, PC, SBP  
Evaluations: DO, SE, ABIM
8. Learn when to obtain consultative services from other physicians such as vascular surgeons, cardiothoracic surgeons, gastroenterologists, etc.  
Competencies: MK, PC, SBP  
Evaluations: DO, SE, 360, ABIM
9. Perform procedure-related evaluations and tasks as outlined in the section on cath lab experience.  
Competencies: MK, PC  
Evaluations: DO, SE, 360
10. Expand his/her knowledge regarding a wide variety of cardiovascular diseases, with emphasis on the evaluation and management of patients requiring cardiovascular interventions.  
Competencies: MK, PC PBLI  
Evaluations: DO, SE, 360, ABIM

## **Goals, Objectives, and Competencies of the Interventional Research Experience**

The interventional fellow is required to participate in an active research project during the fellowship year. The interventional faculty is continually involved in various research projects and the fellow may become involved with the research of (one of) the faculty members, or design his/her own project. Research will be conducted under the direct supervision of (one of) the interventional faculty members. The fellow is highly encouraged to publish results of his/her research and is assisted/supervised in this endeavor by the faculty. During the research experience the fellow should strive to:

1. Learn about evidence-based medicine and its application to daily clinical practice.  
Competencies: PBLI, SBP, PC  
Evaluations: DO, SE, PD
2. Learn about the scientific method.  
Competencies: PBLI, SBP  
Evaluations: DO, SE, PD
3. Learn to critically analyze published research data and determine relevance and application to clinical practice.  
Competencies: PBLI, SBP, MK, PC  
Evaluations: DO, SE, ABIM, PD
4. Apply for funding for a research project, such as a research grant from the American Heart Association or other organization.  
Competencies: PBLI, SBP  
Evaluations: DO, SE, 360
5. Design, perform, complete, and present/publish results of a research project relevant to the field of cardiovascular medicine and intervention, and of interest to the fellow.  
Competencies: PBLI, SBP, MK, IPC  
Evaluations: DO, SE, 360
6. Read, discuss, and understand various types of research, specific research projects, and potential future research interests.  
Competencies: PBLI, IPC  
Evaluations: DO, SE, 360

## **Goals, Objectives, and Competencies of the Interventional Conference Experience**

The interventional fellow is required to attend Angiography and Intervention Conference, Interventional Journal Club and Research Conference, Friday Morning Case Conference (which includes Morbidity and Mortality Conference), and Cardiology Grand Rounds. These conferences are designed to provide the fellow with formal educational experiences regarding a variety of topics which are relevant to general and interventional cardiology, but may not be amenable to on-the-job learning in the cath labs, clinics, and hospitals. The fellow should use these conferences to learn about chronic ischemic heart disease, acute coronary syndromes, pathophysiology of atherosclerosis, endothelial function and dysfunction, platelet function and antiplatelet agents, pathophysiology of thrombosis, anticoagulants and antithrombotic agents, plaque composition and response to intervention, vasopressor drugs, antiarrhythmic drugs, pathophysiology of restenosis, animal models to evaluate restenosis, vascular neogenesis, gene therapy, radiation physics and safety, critical analysis of published research, and other clinical and basic scientific topics. The Departments of Surgery, Radiology, and Physiology also offer conferences of educational value to the interventional fellow.

Competencies: PBLI, IPC, PF

Evaluations: DO, SE, 360, PD

## Goals, Objectives, and Competencies of the On-Call Experience

The main objective of the on-call experience is to provide the fellow with more opportunity to evaluate and treat patients in the emergency setting. This is well outlined above in the descriptions of the cath lab and consultation experiences.

Competencies: PF, MK, PC, SBP

Evaluations: DO, SE, 360, Log

### Means

In order to accomplish these goals and become proficient in these diagnostic and therapeutic cardiovascular techniques the interventional fellow is expected and encouraged to:

- read and study relevant information in textbooks, device manuals, medical journals, industry publications and other media such as videos, CDs, and web-based educational programs.
- participate in as many procedures as possible (within the limitations of the duty hours policy).
- discuss and perform all cases and consultations under the direct supervision of interventional faculty.
- attend conferences provided by the Division of Cardiovascular Medicine, the Department of Internal Medicine, the Department of Surgery, and others.
- attend other conferences and CME courses such as the Florida Chapter of the American College of Cardiology Meeting; The Scientific Sessions of the American Heart Association, the American College of Cardiology, and/or the Society for Cardiovascular Angiography and Intervention; The Transcatheter Coronary Therapeutics Conference; The Interventional Fellows' Course; UF Vascular Biology Working Group Conference; Dr. C. Richard Conti's course on *Diagnostic and Therapeutic Techniques in Clinical Cardiology*; and/or a peripheral vascular course;
- attend industry-sponsored courses and conferences such as the Rotablator Training Course sponsored by Boston Scientific Corporation, Inc.
- participate in research projects.
- talk with other faculty members and teachers.

The UF Interventional Fellowship Program offers ample opportunity for fellows to become expert in all aspects of interventional cardiology. The following table outlines *guidelines* for the numbers of procedures that should be performed by each fellow. The fellow should keep a log of all procedures he/she performs and review it with the PD. Many procedures will use combinations of devices.

<u>Procedure</u>	<u>Number</u>
Balloon Angioplasty and Stenting	75-100
Rotational Atherectomy	10-25
Distal Protection Devices	25
Intravascular Ultrasound	25
Intracoronary Doppler Flow Velocity Analysis	25
Intracoronary Pressure Wire Analysis	25
Alcohol Septal Ablation	5
Pericardiocentesis	5
Peripheral Vascular Procedures	50-75
Intraaortic Balloon Pump Counterpulsation	20
Temporary Pacemaker Placement	10
Vascular Closure Devices	50
Acute Myocardial Infarction Procedures	30
Brachial/radial vascular access	>25
Right/ left heart cath including coronary angiography, ventriculography, & hemodynamics	>200 (usually accomplished during CV fellowship)
Cannulation of internal thoracic arteries and abnormally located coronary ostia	>50 (usually accomplished during CV fellowship)

## Evaluation

Because the interventional fellowship is of one year's duration, levels of responsibility and requirements for promotion are not defined as they are in training programs of several years' duration. Interventional cardiology fellows are directly supervised in all aspects of their training by attending interventional cardiology faculty members. Faculty members continuously monitor the performance and knowledge of the fellows by working with them directly in the cardiac catheterizations labs, by discussion and one-on-one teaching, and by mutual participation in conferences. The fellow should progress throughout the year to assume more progressive responsibility, and should demonstrate achievement of the milestones listed in this document as goals and objectives for training.

### Direct Observation by faculty members and feedback by program director

Faculty members provide feedback to fellows and the program director on a continuing basis. In addition, faculty members complete evaluation forms assessing the fellows' performance in clinic, on the MCI service, and in the cath labs on a monthly basis. The data is collected by the program assistant at least twice per year and reviewed by the program director and program committee. The program director will write a letter summarizing the assessment of the fellow's performance and review it with the fellow.

### 360° Evaluations

"360° evaluations" regarding fellow performance will be obtained on a quarterly basis from other individuals working with the fellows in all aspects of their training, including: nurses, cardiovascular technologists, secretarial staff, medical students, residents, other fellows, referring physicians, the clinic director, the CCU nursing director, patients, families, etc. These are reviewed by the program director and the Program Evaluation Committee and feedback is given to the fellows.

### Case Logs

The best training for individuals attempting to attain proficiency in the performance of procedures is to participate in on-the-job training in the performance of these procedures. This encompasses the most important and the majority of the training experiences of the interventional fellows. As indicated by the guidelines above, fellows should strive to participate in the performance of as many diagnostic and therapeutic interventional cardiovascular procedures as possible under the direct supervision of faculty members. The main learning activity for interventional fellows is to scrub on cases with interventional faculty and learn all aspects of procedural performance by one-to-one interaction with faculty and patients. The program director will review the case logs of all fellows on a monthly basis to ensure that fellows are provided with adequate hands-on experience to become proficient in procedural techniques.

### Self Evaluation

Fellows will also perform self evaluation. This may be accomplished by use of the following:

- Self assessment forms completed at the beginning of the year, mid-way through the year, and at the end of the fellowship.
- Self assessment programs such as the American College of Cardiology Self-Assessment Program II (CathSAPII).
- Educational websites such as:
  - Interventional Fellows Institute [www.interventionalfellowsinstitute.com](http://www.interventionalfellowsinstitute.com)
  - CardioVillage [www.cardiovillage.com](http://www.cardiovillage.com)
  - CathSAP II [www.acc.org/education/products/cathsapII.htm](http://www.acc.org/education/products/cathsapII.htm)
  - The Heart.org [www.theheart.org](http://www.theheart.org)
  - American College of Cardiology [www.acc.org](http://www.acc.org) or [www.cardiosource.com](http://www.cardiosource.com)
  - Society for Cardiovascular Angiography and Interventions [www.scai.org](http://www.scai.org)
  - Up-to-Date [www.uptodate.com](http://www.uptodate.com)
  - PubMed [www.pubmed.gov](http://www.pubmed.gov)
  - Vascular Biology Working Group [www.vbwg.org](http://www.vbwg.org)
  - American Heart Association [www.my.americanheart.org](http://www.my.americanheart.org)
  - WebMD [www.medscape.com](http://www.medscape.com)

Many of these websites present didactic programs with self assessment activities included. Fellows are encouraged to use these on an individual basis. Likewise, some of these resources may be utilized in conferences for teaching and assessment purposes.

#### Testing

Evaluation of the program and competency of fellows' performance is also assessed by the success of interventional fellows taking the ABIM board examination in interventional cardiology. The program director will review and collect data regarding ABIM certification and will address program weaknesses in the event that problems occur.

#### Medical Simulation Experiences

Medical simulation technology has become available in recent years to assist in training fellows in the performance of procedures. Unfortunately, medical simulation laboratories are extremely expensive to set up and maintain. Despite several proposals and requests, financial resources for such educational programs are not provided by the University of Florida, Shands Hospital, the VA Hospital, or Leesburg Regional Medical Center to our training program, and thus far, we have been unable to secure adequate industry support for such endeavors. However, some pharmaceutical and device companies utilize mobile medical simulation laboratories to train physicians in the use of new devices and equipment. We make exceptional efforts to ensure that interventional fellows participate in these educational programs when they are available. In addition to providing education and technical practice in the performance of procedures, these simulation technologies can provide valuable feedback regarding competence in the performance of procedures. We will continue to pursue efforts to educate fellows utilizing this innovative technology. For example, the Boston Scientific company provides simulation training in rotational atherectomy and we try to set up these learning programs at our institution once or twice per year, and ensure that our fellows participate in such training at the Interventional Fellows' Training Course. Simulation training in radial artery cannulation and in the use of PFO closure devices is also available, and we try to assist our fellows in participating in these programs. Any feedback from these programs may be used in the evaluation of fellows' performance and training.

#### Chart review of fellows' documentation

Fellows write progress notes when making rounds on patients to document initial evaluations, daily progress, procedures, laboratory results, summaries of hospitalization, and appropriateness for discharge; they generate the reports regarding cath lab procedures; and they dictate clinic notes on patients evaluated in the outpatient clinics. All documentation is reviewed personally by interventional faculty members and verbal feedback to the fellow should be performed on a regular basis. In addition, the evaluation forms completed by the faculty include comments regarding documentation, and these are reviewed by the program on a regular basis, and feedback is provided to the fellow in their semi-annual evaluations. Review of these notes helps the faculty member ensure that fellows are competent in patient care, medical knowledge, communication skills, and system-based practice.

#### Morbidity and Mortality Review/Quality Assurance Conference

This conference is utilized mainly as an educational exercise by faculty and fellows. However, it may provide some idea of fellow performance and competence.

## Conferences

The Department of Internal Medicine, Division of Cardiovascular Medicine, and (sub) Division of Interventional Cardiology provide numerous conferences to enhance the educational experiences of residents and fellows. Interventional fellows are required to attend the Angiography and Intervention Conference, Interventional Journal Club and Research Conferences, Friday Morning Case Conference (which includes Quality Assurance and Morbidity and Mortality Conference), Cardiology Grand Rounds, and various special conferences throughout the year. Fellows are excused from other duties in order to attend conferences.

**Angiography and Intervention Conference** provides formal instruction and discussion with faculty regarding a variety of diseases, procedures, devices, issues, and research especially related to diagnostic and therapeutic interventional cardiovascular medicine. The interventional fellow is an active participant in all of these conferences. At times the fellow will be responsible for presenting these conferences under the supervision of an interventional cardiology faculty member. The majority of these conferences involves didactic teaching, and other conferences involve case presentations and discussion, including discussion of morbidity and mortality and quality issues.

**Interventional Research Conference and Interventional Journal Club** are each held at least once per month. An interventional cardiology fellow, faculty member, or guest speaker presents journal articles or research topics or results involving clinical or basic science research related to interventional cardiology. Presentations, research, journal articles, or manuscripts are critically appraised in discussion among the fellows and faculty regarding the research methodology and results, the relevance and application to clinical practice, and the contribution to scientific knowledge. Goals of these conferences include helping the fellow locate, appraise, and assimilate evidence from scientific studies; apply knowledge of study design and statistical methods to the evaluation of clinical studies; to use information technology to manage information, access on-line medical information, and support their own education; and to facilitate the learning of students, faculty, and other health care professionals. Discussion often includes evaluation of our own patient care practices and ways to improve patient care, quality, and existing medical practice and delivery systems.

**Friday Morning Clinical Case Conference** reviews 2-3 interesting, unusual, and/or complicated cases, at least one of which usually involves diagnostic and/or therapeutic cardiovascular interventional procedures. The presentations usually involve multiple media including echocardiography, MRI, CTA, angiography, and other imaging modalities. Cases are presented by general, electrophysiology, and interventional cardiology fellows and discussed by the fellows and faculty. Cardiothoracic and vascular surgeons and pediatric cardiologists often participate in these conferences as well.

**Morbidity and Mortality/Quality Assurance Conference** is held quarterly to discuss complications of various procedures as well as quality assurance and cost-containment issues.

**Interventional Cardiology Board Review.** Dr. Scott Denardo is developing an interventional cardiology board review course to help fellows prepare for the ABIM interventional board exam. It will start in October or November after fellows have taken the ABIM board exam in Cardiovascular Diseases. Faculty and fellows will participate on a voluntary basis. Web-based programs utilizing didactic teaching and self-assessment questions may be a part of this program.

**Cardiology Grand Rounds** involves formal presentations usually by faculty members, often by fellows, regarding specific cardiovascular topics. Presentations frequently showcase new, progressive, cutting-edge research, medications, procedures, or devices, and updates on specific diseases. Each conference is officially approved for one hour of CME credit. Outstanding clinicians and scientists from around the world frequently present Cardiology Grand Rounds at UF. Topics such as endothelial function and dysfunction, platelet function and antiplatelet agents, arteriosclerosis and plaque composition, glycoprotein IIb/IIIa receptor inhibitors, and thrombolytic agents may be presented.

Other conferences are provided by the Division of Cardiovascular Medicine for the general cardiology fellows. Interventional fellows are encouraged to attend these conferences as time and interest permit: ECG Conference (weekly), Nuclear Cardiology Conference (three times per month), VA Conference (monthly)

Noninvasive Diagnostic Imaging Conference (biweekly), and Congestive Heart Failure Conference (monthly). In addition, there are several cardiac electrophysiology (EP) conferences available including EP ECG Conference (monthly), EP Case Conference (weekly), EP Conference – Selected Topics (monthly), and EP Journal Club (monthly).

The Department of Internal Medicine offers *Grand Rounds, Morbidity and Mortality Conference*, and special conferences throughout the year which are often relevant to interventional cardiology. The interventional fellow is encouraged, and sometimes required, to attend some of these conferences. The conferences regarding *Substance Abuse, Sexual Harassment, Domestic Violence, and HIV* are required to maintain a Florida Medical License. Conferences on *Sleep Deprivation* and *The Impaired Physician* are also required.

The UF Departments of Pediatric Cardiology, Physiology, Surgery, and Radiology frequently offer conferences relevant to interventional cardiology. For example, the Department of Physiology has conferences regarding endothelial and microvascular function, arteriosclerosis, vascular neogenesis, growth factors, and genetic manipulation and therapies.

Interventional fellows are also encouraged to attend regional and national meetings such as the American College of Cardiology Scientific Sessions, the American Heart Association Scientific Sessions, the Transcatheter Coronary Therapeutics Conference (TCT), Society of Cardiac Angiography and Intervention (SCAI), Florida Chapter of the American College of Cardiology Annual Meeting, and others. Fellows are encouraged to participate in relevant extramural courses such as peripheral vascular training and imaging courses. Funding to support fellow attendance to these meetings and courses is often available.

#### Interventional cardiology residents' responsibilities in preparing and presenting conferences

Approximately 8 times per year the interventional fellow is asked to prepare and present in one of the interventional conferences under the supervision of the interventional faculty. He/she may present journal club, a teaching case in which he/she participated, research or pertinent information he/she has read (for example, information on platelet function or endothelial function, or certain cardiac hemodynamics, or coronary blood flow characteristics). He/she discusses the presentation with an interventional attending prior to the conference, and the attending is present at the conference to supervise the presentation and make additional teaching points. Interventional fellows also present cases at Friday Morning Case Conference several times per year.

## Textbooks and Other Educational Resources

- | <u>Educational websites:</u>                             | <u>Web address</u>   |
|--|--|
| Interventional Fellows Institute                         | <a href="http://www.interventionalfellowsinstitute.com">www.interventionalfellowsinstitute.com</a>             |
| CardioVillage  | <a href="http://www.cardiovillage.com">www.cardiovillage.com</a>   |
| CathSAP II   | <a href="http://www.acc.org/education/products/cathsapII.htm">www.acc.org/education/products/cathsapII.htm</a> |
| The Heart.org  | <a href="http://www.theheart.org">www.theheart.org</a>   |
| American College of Cardiology                           | <a href="http://www.acc.org">www.acc.org</a> or <a href="http://www.cardiosource.com">www.cardiosource.com</a> |
| Society for Cardiovascular Angiography and Interventions | <a href="http://www.scai.org">www.scai.org</a>   |
| Up-to-Date   | <a href="http://www.uptodate.com">www.uptodate.com</a>   |
| PubMed   | <a href="http://www.pubmed.gov">www.pubmed.gov</a>   |
| Vascular Biology Working Group                           | <a href="http://www.vbwg.org">www.vbwg.org</a>   |
| American Heart Association                               | <a href="http://www.my.americanheart.org">www.my.americanheart.org</a>   |
| WebMD  | <a href="http://www.medscape.com">www.medscape.com</a>   |
- ACC's Interventional Cardiology Study Guide. An ACC meeting on demand.  
<http://www.cardiosource.com/GenSAP/mainmenu.asp?ProductID=58>.
- 900 Questions: An Interventional Cardiology Board Review. Edited by Mukherjee, Cho, Moliterno, Lippincott Williams & Wilkins, Philadelphia, 2007.
- SCAI Interventional Cardiology Board Review Book. Edited by Morton J. Kern., Lippincott Williams & Wilkins, Philadelphia, 2007.
- Interventional Cardiology. Edited by Spencer King and Alan Yeung, McGraw Hill Medical, China, 2007.
- Problem Oriented Approaches in Interventional Cardiology. Edited by Colombo and Stankovic, Informa UK Ltd, London, 2007
- Guide to Peripheral and Cerebrovascular Intervention. Edited by Deepak L. Bhatt, Remedica Publishing, Chicago, 2004.
- Manual of Peripheral Vascular Intervention. Edited by Casserly, Sachar, and Yadav. Lippincott Williams & Wilkins, Philadelphia, 2005.
- Complications of Percutaneous Coronary Intervention. Edited by Samuel M. Butman. Springer Science + Business Media, Inc., New York, 2005.
- Strategic Approaches in Coronary Intervention. Third Edition. Edited by Stephen G. Ellis and David R. Holmes, Jr. Lippincott Williams and Wilkins, Philadelphia 2006.
- Diagnostic and Therapeutic Cardiac Catheterization, Third Edition. Edited by Carl J. Pepine, MD, James A. Hill, MD, and Charles R. Lambert, MD. Williams and Wilkins, Baltimore, 1998.
- Grossman's Cardiac Catheterization, Angiography, and Intervention, Seventh Edition. Edited by Donald S. Baim MD. Lippincott Williams & Wilkins, Philadelphia, 2006.
- Textbook of Interventional Cardiology, Fourth Edition. Edited by Eric J. Topol, M.D. W.B. Saunders Company, Philadelphia, 2003.
- Interventional Cardiovascular Medicine, Principles and Practice, Second Edition. Edited by Richard S. Stack, MD, Gary S. Roubin, MD, and William W. O'Neil, MD. Churchill Livingstone, Philadelphia, 2002.

15. Techniques in Coronary Artery Stenting by Antonio Colombo, MD and Jonathan Tobis, MD. Martin Dunitz Ltd., London, 2000.
16. Guide to Rotational Atherectomy by Mark Reisman, MD. Physicians' Press. Birmingham, Michigan, 1997.
17. Introduction to Vascular Ultrasonography, Fourth Edition. Edited by William J. Zwiebel, MD. W.B. Saunders Company, Philadelphia, 2000.
18. Adult Clinical Cardiology Self Assessment Program 6 (ACCSAP 6). Comprehensive review of adult clinical cardiology produced by the American College of Cardiology Foundation. This resource includes ABIM-type self-assessment questions, information from more than 100 expert authors, over 1000 images for use in PowerPoint slides and a database of summaries. Available at [www.acc.org](http://www.acc.org) and [www.scai.org](http://www.scai.org).
19. Catheterization and Cardiovascular Interventions. Official Journal of the Society for Cardiac Angiography and Interventions. Wiley-Liss, Inc.

**All textbooks, journals, and the CathSAP program are available in the office of the Program Director.**