

Penn State Heart and Vascular Institute
Interventional Radiology Revised Curriculum
June, 2007

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Introduction:

This revised curriculum will describe the program in general, the impact the ACGME Outcomes have on the fellowship program, expectations of the fellows, the evaluation process, a schedule of conferences and journal club meetings, the quarterly benchmarks each fellow is to obtain, and then cover specific subjects that the fellow will see during their training or that they should have a thorough knowledge. This document should be reviewed early in the fellowship.

General Program Information:

Content for this curriculum was derived from a compendium of several previous documents and reference material. This includes the previous Penn State Cardiovascular Interventional Radiology Curriculum, The SIR IR Curriculum (1996), the British Society of Interventional Radiology Syllabus (2006) and the Joint Committee on Higher Medical Training (JCHMT-UK) Curriculum for Cardiology (2005).

Entry into the Cardiovascular Interventional Radiology fellowship is after completion of a Radiology residency. The resident entering the program must be in good standing and preferably passed the American Board of Radiology licensing exam or be eligible to sit for that exam. The fellowship is a one-year program, concentrating on the clinical aspect of the full gamut of Interventional Radiology procedures. Fellows will also spend time learning non-invasive diagnostic cardiovascular imaging, including CTA, MRA, cardiac MR and coronary CTA under the direct supervision of the Interventional Radiology faculty. Duplex imaging will be taught both by the Interventional Radiology faculty and the Vascular Surgery faculty. Research will be strongly encouraged but is not mandatory for completion of the fellowship. At the completion of the fellowship, the fellow will be eligible to apply to the CAQ examination in Vascular/Interventional Radiology.

ACGME Outcomes:

The ACGME several years ago initiated the Outcomes Project evaluating programs in six general competencies. These competencies include (from the ACGME website www.acgme.org/outcome):

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

Each of these is applicable to an Interventional Radiology fellowship and will be individually evaluated during the year (see evaluations section). It will be very important for you to review the competencies and understand their implication to your educational program.

Expectations:

Each fellow in the program will be expected to perform at a level commensurate with their training. The fellow will demonstrate that patient care is of the utmost importance and work to address patient needs before, during and after the procedure. The fellow will continually expand his Interventional Radiology knowledge base, in the first quarter by reading the listed reference material, in the second quarter by supplementing text reading with appropriate journal articles, in the third quarter by using predominantly journal articles, reviewing texts for less common procedures and by the fourth quarter, using all available resources to ensure that specific subjects are understood in depth. The fellow will perform self-assessments on a quarterly basis to ensure that their own practice-based learning is complete. As the fellow progresses through the year, he or she should be more comfortable with each of the procedures and be able to communicate the procedure in detail to the patient and its possible complications and present it in a professional manner. The fellow should be able to do this for peers, colleagues and referring physicians as well. Finally, in the fourth quarter, the fellow will be expected to have an understanding of Cardiovascular Interventional radiology in the larger context of practicing medicine in the 21st century.

On a practical level, the fellow will be expected to be on time, appropriately dressed and groomed for work each day, display a positive attitude and a strong work ethic.

Evaluations:

The evaluation process is to ensure that the fellows fulfill the requirements of the fellowship, specifically related to the competencies. The evaluation process will be conducted at several levels during the year. It will consist of:

1. Quarterly evaluations by the faculty (attached). The comments will be based on the fellows' performance in the angiography suites including his or her ability to evaluate patients, take care of the patients after the procedure and management of complications. The evaluations are based on the level of experience to that point. The evaluations will be filled in the New Innovations web-based portal. The program coordinator for the program will ensure that the comments are appropriate. The original evaluations will be reviewed by the Program Director, **only to make sure there are no inappropriate comments**. Any derogatory comments will be removed in their entirety. The summary evaluation will be reviewed with the fellow in private and he/she can have a discussion with the Program Director about the comments. At that time, the fellow can offer general comments about the program.
2. Quarterly evaluations of the faculty by the fellow (attached). The evaluations will be filled in the New Innovations web-based portal. The program coordinator for the program will ensure that the comments are appropriate. The original evaluations will be reviewed by the Program Director, only to make sure there are no inappropriate comments. The Interventional Radiology fellow's comments will be combined with those of the Vascular Surgery fellow, improving the anonymity of the evaluation process. Comments should be professional and constructive in nature. Any derogatory comments will be removed in their entirety. In case there is a significant issue between a fellow and the faculty, a meeting will be set up by the Program Director and minutes of that meeting will be included in the evaluation process.
3. 360 Evaluations (attached). Biannually, a 360 degree evaluation will be sent to the personnel working with the fellow on a regular basis, including technologists and nurses in the CVIR suite, nursing staff on the short stay ward, and personnel in other areas through which the fellow will be rotating. These evaluations will be paper based initially since not all employees have access to the New Innovations web portal. The results of those evaluations will be submitted to the administrative assistant for the program who will then anonymize the results. Those results will be reviewed with the fellow by the Program Director and the fellow will be encouraged to offer comments.

Schedule Including Conferences and Journal Clubs:

1. Each morning at 7:30am, morning rounds discussion is held in the cardiovascular reading room by the attendings on service, the fellows, the residents rotating through CVIR as well as any medical students on the service. The conference will be run by the “A” attending. The fellows will be responsible for organizing the day’s cases and ensuring that the residents have completed the pre-procedural work up correctly.
2. The fellows will be expected to attend the schedule conference series for the combined Interventional Radiology / Vascular Surgery conference series (the listing is attached). The fellow will also be expected to deliver a specific number of the lectures as noted on the schedule. These conferences are given from 7-8am in the Surgery Library on the 4th floor of the Crescent. Following this lecture is the Multidisciplinary Angiography Conference, held from 8-9am in the Radiology Conference Room. This conference is also mandatory and will be run by the fellows. The conference alters week to week between Interesting Case presentations and Morbidity and Mortality Conference.
3. HVI Grand Rounds, given on Thursday mornings 7am to 8am in Lecture Room C, are lectures given by a combination of specialties in the Heart and Vascular Institute and so, offer excellent learning opportunities for trainees.
4. Hospital Wide ACGME Outcomes Lecture Series, sponsored by the Office of Graduate Medical Education, cover topics pertinent to the ACGME Outcomes Project and are mandatory for housestaff at all levels.
5. Journal Club. Journal club will be held 4 to 6 times per year. You are also invited to participate in the Vascular Surgery journal club, depending on the topic covered. For the Interventional Radiology journal club, the choice of articles will be at the fellows’ discretion but may be clustered by topic, by didactic concept (ie, renovascular hypertension) or as a sampling of current literature. The articles will be chosen and assigned by one of the fellows to housestaff on service to review. The meeting itself will be held at a faculty member’s house. During the year, one of the meetings will also be used as a curriculum review committee meeting, involving attendings, fellows and residents in an overall review of the program and a general discussion of what can be improved in the curriculum.

Quarterly Goals and Objectives

1. In the first quarter, the following goals should be met by each fellow level trainee:
 - a. Familiarity with the physical plant of the CVIR suites including the function and operation of the angiography equipment, the use of the institutional PACS, the use of the iSchedule program, the location and use of the emergency equipment (ie the crash cart) and where and how procedural equipment is inventoried.
 - b. Familiarity with the layout of the hospital.
 - c. Understand the indications for each of the more common procedures performed in CVIR.
 - d. Understand and apply sterile technique in the angiography suites and in the operating room.
 - e. Understand the first few steps of each of the more common procedures.
 - f. Be able to identify and treat several of the more common post-procedural complications.
 - g. Understand the post-procedural management of the more simple procedures and familiarize themselves with the management of more complex post-procedural issues.
 - h. Be able to order post-procedural orders specific to the procedure performed.
 - i. Complete the recommended reading for the first quarter (See reading list).

2. In the second quarter, the following goals should be met by each fellow level trainee:
 - a. Thorough knowledge of the more common procedures performed in CVIR.
 - b. Be able to discuss with confidence the pathophysiology of a vast majority of the disease processes seen in CVIR.
 - c. The ability to perform independently (with attending supervision) recurrent or routine procedures with guidance specifically for the perfection of technique
 - d. Be able to supervise the residents in the daily activities of the CVIR service.
 - e. Be able to use the current literature to supplement the recommended reading list.
 - f. Understand the workflow in the CVIR suite and the hospital.
 - g. Be able to manage post-procedural patients, understanding the expected recovery issues and those that indicate a complication.
 - h. Complete the recommended reading for the second quarter (See reading list).

3. In the third quarter, the following goals should be met by each fellow level trainee:
 - a. Have in depth knowledge of the more common procedures performed in CVIR.
 - b. Have an extensive understanding of the pathophysiology seen in CVIR.
 - c. Be able to work independently (with attending supervision) on the recurrent procedures as well as those procedures less commonly seen.
 - d. Manage the trainee resources including residents and medical students.
 - e. Have a good knowledge of the current literature and participate in journal club.

- f. Understand how CVIR impacts the patient, the referring service and the hospital.
 - g. Be able to manage complex post-procedural complications.
 - h. Complete the recommended reading for the third quarter (See reading list).
4. In the fourth and final quarter, the following goals should be met by each fellow level trainee:
 - a. Understand the complete spectrum of procedures performed in CVIR.
 - b. Understand the steps, both basic and advanced, for any given IR procedure. Using these steps, be able to generate a procedural algorithm including steps to handle a possible complication
 - c. Have a solid working knowledge of the current literature, including controversial topics.
 - d. Have a good understanding of the management of a CVIR service, including patient management issues, coding, billing, supply procurement and the QA process.

Recommended Reading:

1st Quarter:

1. Kandarpa K. and Aruny J. Handbook of Interventional Radiologic Procedures. Lippincott, Williams and Wilkins. 2002.
2. Kaufman J. and Lee M. The Requisites-Vascular and Interventional Radiology Mosby. 2004.
3. Kadir S. Normal and Variant Angiographic Anatomy WB Saunders. 1991.

2nd Quarter:

1. SCVIR Syllabus Series-Volumes are available in the fellow's office. Any volumes not available are in Dr. Singh's office.
2. Nephrotoxic Effects in High-Risk Patients Undergoing Angiography by Peter Aspelin, M.D., Ph.D. in the NEJM
3. Quality Improvement Guidelines for Arteriography by Harjit Singh, MD in JVIR

3rd Quarter:

1. Complication Rates of Percutaneous Brachial Artery Access in Peripheral Vascular Angiography by Peter J. Armstrong, MD
2. The remaining standards of practice located at <http://www.sirweb.org/clinical/quality.shtml>
3. TASC-Journal of Vascular Surgery Jan 2000 Supplement-in HS' Office
4. Inter-Society Consensus for the Management of Peripheral Arterial Disease (TASC II) by L. Norgren,1*

4th Quarter:

1. Articles for reading from the literature including JVIR, SVS and NEJM.