ECHOCARDIOGRAPHY and VASCULAR IMAGING SERVICES

Mission Statement

The directive of the Echocardiography and Noninvasive Imaging Lab is to provide an integrative experience in adult echocardiography and vascular imaging and to emphasize the relationship between cardiovascular anatomy as seen with ultrasound imaging, and the pathophysiology of clinical disease. We endorse the statement of mission implicit in the Guidelines for Training in Adult Clinical Cardiovascular Medicine (Core Cardiology Training Symposium [COCATS]; JACC Vol. 25, No. 1; January 1995: 1-34. and Quinones, M. ACC/AHA Clinical Competence Statement on Echocardiography. A Report of the American College of Cardiology/American Heart Association/American College of Physicians–American Society of Internal Medicine Task Force on Clinical Competence. JACC 2003 41;687-708).

Statement of Educational Goals

The curriculum is designed to promote six broad goals based on the six ACGME core competencies:

(1) Medical Knowledge: Exposure to a broad range of acute and chronic cardiovascular problems both through direct patient imaging and through many formal and informal didactic teaching sessions.

(2) Patient Care: The training focuses on echocardiographic diagnoses that are based physiological principles and the pathophysiology of disease. To this end, most imaging is performed at the bedside so that the clinical findings may be integrated with the diagnostic imaging. The best treatment plan for each clinical scenario is discussed and implemented.

(3) Professionalism: Echocardiographic imaging provides a greater wealth of information in the shorter period of time compared to any other cardiovascular test or even the clinical exam. In addition, the patient and their families often see the images during acquisition. This combination demands that the training include methods for communicating with patients, families, other physicians and allied health care personnel. Maintaining highest ethical standards and strict privacy when discussing patient case plans with other providers is also the goal of our training.

(4) Interpersonal and Communication skills: As consultants, the ability to communicate our findings with the primary care givers and the patients is one of our most important tasks. The training emphasizes the most accurate and efficient means of communicating with both the spoken and written word.

(5) Practice Based Learning: Using information technology, literature sources and other available resources to practice evidence based medicine based on sound medical principles, guidelines and best practices, while being still able to individualize this for a particular patient's circumstances.

(6) Systems Based Learning: Training will emphasize the integration of echocardiographic imaging and the other medical and surgical services. The bedside nature of echocardiography is a prime example of how this imaging modality is integrated into routine patient care. It is common for echocardiographic imaging to be performed throughout the hospital in all patient care areas, including but not limited to the medical floors, CCU, ICU and operating room. This exposure helps the trainee learn how care delivery systems work and how to use those systems to the maximal benefit of the patient..

Statement of Educational Objectives for Fellows

Cardiology fellows are expected to obtain proficiency in transthoracic echocardiography within the first year of their fellowship and Level II skills as defined by the COCATS criteria by the time they complete three years of cardiovascular training (see below). Cardiology fellows are also expected to have had sufficient experience at the interpretation and performance of contrast echo, stress echo and transesophageal echocardiograms by the end of their fellowship training that would allow them to provide these services at the community hospital level. The average echo exposure for fellows completing the standard 3-year cardiovascular program has been in excess of 1200 cases (100 to 150 of which are stress echoes and 125 to 250 are transesophageal echoes). Minimal training for the independent performance of all echo procedures is Level II experience *plus* 100 stress echoes and 50 transesophageal intubations/echoes. Therefore, most fellows have a sufficient caseload to meet these requirements during their 3-year fellowship.

COCATS Training Requirements for Transthoracic Echocardiography (TTE)

Training Level	Objective	Cumulative Duration	# Cases Performed	# Cases Interpreted
I	Understanding of 2DE indications	3 months	75	150
II	Independently perform 2DE	6 months	150	300
III	Echo lab director & teach fellows	12 months	300	750

COCATS Training Requirements for Transesophageal Echocardiography (TEE)

Component	Objective	Caseload
Level II TTE	Background knowledge and skills	150 TTE
Esophageal Intubation	TEE probe introduction	25
TEE Exams	Performance and interpretation	50

COCATS Training Requirements for Stress Echocardiography

- Understanding of the basic principles, indications, applications, and technical limitations of echocardiography.
- Level 2 training in transthoracic echocardiography.

- Specialized training in stress echocardiography with performance and interpretation of 100 stress studies under appropriate supervision by a Level III echocardiographer.

Detailed Statement of Expectations of Fellows

To achieve the goals of echocardiography training, cardiovascular fellows will have a 7-month experience divided between their first year (3 months), second year (1 month) and third year (3 months). Ms. Jennifer Forbes, RDCS, RVT is the sonographer directing fellow training. Dr. Karl Schwarz, as Echo Lab director, is the overall head of fellowship training in echocardiography. Dr. James Eichelberger is director of the Clinton Crossings outpatient facility and coordinates training at that location.

The first year experience. There are 3 months dedicated to echo training in the first year. The initial experience will be spent primarily learning the technical aspects of image acquisition under the tutelage of a board-certified sonographer. As is the case with most technical endeavors, proper preparation will ease the initial training period. It is therefore suggested that all fellows read and *study* the initial chapter on basic cardiac anatomy in *The Echo Manual* (Editor: Jae Oh) *before* starting their echo rotation and finish the *entire text* by the end of the first month. A copy of this text is available in the echo lab or may be purchased from the Medical Center Bookstore. Fellows are urged to purchase and read the textbook *Principles & Practice of Echocardiography, second edition* (Editor: Weyman) by the end of the fellowship. Cardiovascular fellows are expected to obtain proficiency at transthoracic image acquisition and interpretation by the end of their first year of fellowship. The fellow should achieve basic understanding of the utility and indications for transthoracic, transesophageal and stress echocardiography and achieve technical proficiency in the following areas:

1. Assessment of cardiac morphology.
2. Assessment of LV/RV regional and global systolic function.
3. Assessment valvular function and specifically the standard evaluation of valve stenosis/regurgitation, estimation of pulmonary pressures and the standard evaluation of prosthetic heart valves.
4. Assessment of pericardial disease, specifically pericardial effusion/tamponade.

Fellows will be given both practical and written tests on the technical aspects of echocardiography and image interpretation of common cardiovascular diseases.

IT IS ALSO EXPECTED, ESPECIALLY DURING THE FIRST YEAR OF FELLOWSHIP, THAT FELLOWS WILL ACTIVELY PARTICIPATE IN THE STRESS PORTION OF TESTING, DIRECTLY PARTICIPATING IN TREADMILL AND PHARMOCOLOGIC PROTOCOLS. THESE SHOULD BE DOCUMANTED BY THE FELLOW TO TRACK THE NUMBER OF STRESS TESTS DIRECTY SUPERVISED DURING THEIR TRAINING.

The second and third year experience. The second year experience is 1 month and the third year experience is 3 months. When fellows return to the Echocardiography Laboratory in their second and third years, the initial time is typically spent as a time of refresher because most fellows have been out of the lab for up to 12 months. This is also an opportunity for fellows to integrate the echocardiographic examination into what they have learned in other cardiovascular

disciplines, such as cardiac catheterization, clinical cardiology and nuclear cardiology. The emphasis of training is shifted to honing transthoracic echo interpretative skills and learning stress echo and performance of TEE during the third year. Fellows will spend the majority of their time with the senior attending in the echocardiography laboratory. At this time the fellow will be expected to supervise and interpret stress echocardiograms and gain a thorough knowledge of contrast echo techniques. Fellows will also perform of transesophageal studies on a regular basis. At a minimum, a fellow must reach Level II training in transthoracic echo and complete at least 50 supervised transesophageal studies and 100 supervised stress echocardiographic studies to be certified to independently perform these procedures. In the third year, fellows will also be exposed to the performance and interpretation of vascular ultrasound examinations (primarily venous and carotid artery exams). It is expected that fellows gain sufficient experience with these procedures to aid in the selection of patients for the examination. The requirement for independent certification is 50 carotid artery ultrasounds and 50 venous examinations plus Level II echo training. If a fellow is interested in independent certification in vascular imaging, then additional time can be arranged in vascular surgery to achieve the required caseload.

The fellow should achieve technical proficiency in the following areas by the end of their third year:

1. The evaluation of cardiac and valvular masses (eg: clots, tumors, infections, immune reactions, sclerotic changes, etc).
2. The assessment of LV diastolic function and the quantitative assessment of LV systolic function.
3. Advanced valvular function analysis (eg: the assessment of regurgitant orifice area, nuances of valvular pathophysiology, etc).
4. Advanced analysis of pericardial disease (eg: pericardial constriction, pericardial clot, and restrictive myocardial disorders).
5. The evaluation of aortic pathology (eg: aneurysm, dissection, intramural hematoma, etc).
6. Contrast echocardiography (patient selection, physics, instrumentation, practical application and interpretation).
7. Stress echo and the assessment of myocardial ischemia by echo techniques.
8. Transesophageal echo (patient selection, conscious sedation techniques, instrumentation, performance and interpretation).

<u>Additional Conferences/Teaching Sessions</u>

A. Echo interesting cases conference held monthly in the AC-Ground conference room

B. Fellow presented echo conference on a clinical topic held monthly in the AC-Ground conference room.

C Fellow presented echo conference on a clinical topic held roughly 6x per year in the AC-Ground conference room.

Vacation policy. All fellows receive 4 weeks of vacation per academic year. The rotations in echo make up less than 25% of any given academic year. Therefore, fellows may take no more

than 1 week of vacation during their echo rotations in the first and third years. All vacation time must be pre-approved by Dr. Schwarz in advance and *before* booking non-refundable tickets, etc.

Night and weekend call. Fellows are responsible for performing all night and weekend transthoracic echos on a rotating call basis. Echo sonographers are available to assist fellows in obtaining images on Saturdays and can be reached through the standard page system. Fellows are encouraged to make use of the on-call sonographer, especially for difficult cases. After performing the exam, the fellow will generate a preliminary report after discussing the case with the echocardiography attending by phone, if needed. The echo attending will have the option of coming in or reviewing the study on the next working day. If the attending does not review the study at the time of the exam, then the fellow is expected to review the study with the attending on the morning of the next regular work day. A final report will then be generated. Fellows take echo call only after completion of at least one month on the echocardiography service.

"Esprit de corps". Finally, it should be realized that the attitude of the trainee is an important factor in the success of their training and the reputation of the laboratory. It is important at all times to treat patients with the same courtesy, dignity and friendliness that one would desire for oneself or one's own family members. The echocardiogram is potentially the most "patient-friendly" procedures in the cardiologist's armamentarium. The patient's experience and that of the referring physician should be positive and professional. To that end, fellows must act and dress in a manner reflecting their position as a professional. This means a clean pressed shirt and pants and professional work shoes (no sneakers, please). Surgical scrubs are not a substitute for regular professional clothing and should only be worn on days when they are required for medical duty (like when performing transesophageal echos in the operating room). A lab coat is optional.

Procedures during normal working hours. When fellows perform echocardiograms, they are responsible for all aspects of care related to that procedure. This means preparing the room before the study, escorting the patient to the room, performing the exam, generating the report, reviewing the study *with* the attending, discharging the patient and cleaning the room after the study. Fellows may also be called upon to prep patients for transesophageal echocardiograms and supervise exercise tests. Fellows must become familiar with the video tape storage system to function effectively in the lab. Most fellow exams are re-scanned by one of the sonographers before the study is reviewed by the attending. This quality control measure is required by the operator-dependent nature of ultrasound imaging.

After-hours consults/procedures. All fellows have keys to the echo exam rooms in the ACF. Tapes and preliminary reports should be left in the "night and weekend" tape box located in the echo reading room for review by the attending on the next working day.

Research Opportunities

Clinical Research. A wide range of clinical research opportunities are available to fellows in the Echo Lab. The main clinical research interests of the Echo faculty fall into 2 broad categories: (1) the evaluation of acute ischemic syndromes, and (2) contrast echocardiography. Fellows are encouraged to consult with the Echo faculty members about clinical projects that are on going or planned for the future. In addition, the Echo Lab has been using a computerized database for patient reporting since January 1991. This database may be utilized in echo or cardiology research projects and cross-correlated with other databases.

Basic Research. Dr. Schwarz has a strong interest in basic ultrasound research, particularly in contrast echo. In collaboration with the *Center for Biomedial Ultrasound* (a consortium of physicians, engineers and physicists), a wide range of basic ultrasound research is possible. Fellows with a background in engineering, physics or mathematics are encouraged to consult with Dr. Schwarz before or during their first year of fellowship, if they would like to use this expertise in a formal research project. Dr. Schwarz also operates a fully digital animal research lab and has built a computer-controlled artificial heart/hemodynamics system for use when a live animal model is not required.

Credentials of Medical Staff

Karl Q. Schwarz, MD

College:	Bowdoin College (AB)
Medical School:	University of Rochester (MD).
Internal Medicine Residency:	University of Rochester
Cardiovascular Fellowship:	University of Rochester

James P. Eichelberger, MD

College:	University of Rochester (BA)
Medical School:	University of Rochester (MD)
Internal Medicine Residency:	University of Vermont
Cardiovascular Fellowship:	University of Rochester

Gladys P. Velarde, MD

College:	New York University (BA)
Medical School:	New York University (MD)
Internal Medicine Residency:	Columbia Presbyterian Hospital, NY, NY
Cardiovascular Fellowship:	Mount Sinai Hospital, NY, NY

Hanna Z. Mieszczanska, MD

College:	Gen. Jankowski Lycee, B.S.
Medical School:	Warsaw University School of Medicine, M.D.
Internal Medicine Residency:	SUNY Stony Brook
Cardiovascular Fellowship:	Winthrop University Hospital

Eugene Storozynsky, M.D., Ph.D.

College:	University of Rochester - BS University of Rochester - PhD
Medical School:	University of Rochester Medical Center
Internal Medicine Residency	University of Rochester Medical Center
Cardiovascular Fellowship	University of Rochester Medical Center

Credentials of Medical Staff Con't

Duncan D. Wormer, M.D.

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Barbara J. Kircher, MD

Medical School:	University of Virginia School of Medicine
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