

ROTATION MANUAL FOR CARDIOVASCULAR NUCLEAR MEDICINE[®]
Cardiology Fellow Rotation
(Nuclear Cardiology 1 - SLEH)

ST. LUKE'S EPISCOPAL HOSPITAL
NUCLEAR MEDICINE SERVICE

NUCLEAR MEDICINE DEPARTMENT OVERVIEW

Facilities and Personnel: The Nuclear Medicine Department (the Department) of St. Luke's Episcopal Hospital (SLEH, the Hospital) operates three imaging laboratories: General Nuclear Medicine on the 26th floor of the Hospital, Cardiovascular Nuclear Medicine (CVNM) on the 3rd floor of the Hospital, and Outpatient Nuclear Medicine (primarily cardiac) on the 11th floor of the O'Quinn Medical Tower (SLMT). The Department also serves the Texas Heart Institute (THI). The Department is staffed by nuclear medicine physicians and scientists who are members of the Nuclear Medicine Section of the Department of Radiology of Baylor College of Medicine (BCM, Baylor) and who make up the majority of the Hospital's Nuclear Medicine Service and by technologists and other support personnel who are Hospital employees. Members of the faculty also provide certain nuclear medicine services at St. Luke's Community Medical Center in the Woodlands (CMCW), Texas Children's Hospital (TCH), PET Imaging of Houston (PIH), and other facilities.

Members of the Nuclear Medicine Section faculty who are active at SLEH/THI include:

- Anupa Arora, M.D., MPH
Faculty nuclear medicine physician; Instructor of Radiology
- Ramesh Dhekne, M.D.
Associate Chief of the Nuclear Medicine Service and Director of General Nuclear Medicine; certified by ABNM; Associate Professor of Radiology.
- Patrick Ford, M.D.
Faculty nuclear medicine physician; certified by ABNM; Clinical Assistant Professor of Radiology.
- Ed Giles, M.S.
Assistant Radiation Safety Officer for SLEH/THI; certified by the ABR in Diagnostic Radiologic Physics and the American Board of Science in Nuclear Medicine; Instructor of Radiology.
- Warren Moore, M.D.
Chief of the Nuclear Medicine Service and Director of CVNM; certified by ABIM and ABNM; Associate Professor of Radiology.
- Paul Murphy, Ph.D., MBA
Radiation Safety Officer for SLEH/THI; certified by the American Board of Science in Nuclear Medicine; Professor of Radiology.

Other Department personnel you may encounter include technologists and clerical staff members, and particularly

- Leticia Alanis-Williams, B.S., RT(N); Nuclear Medicine Manager
- Randy Barker, B.S., RT(R), RT(N), CNMT; Technologist Supervisor for General Imaging
- Cindy Gentry, B.S., CNMT; Nuclear Medicine Quality Coordinator
- Marly Gonzalez, B.S., CNMT; Technologist Supervisor for CVNM
- Bryan Fritz, B.S.; Radiation Safety Technician
- Joe Knisel, M.S.; Nuclear Medicine Information Systems Manager
- Nayaka Shaw; Office Coordinator

Scope of Service: Routine diagnostic and therapeutic nuclear medicine services are available in the SLEH laboratories, 8 a.m. to 5 p.m., Monday–Friday except for official Hospital holidays. Myocardial perfusion studies for the Cardiac Observation Unit and for observation (POS) patients are usually available 8 a.m. to 10 p.m. Monday-Friday and 8 a.m. to 8 p.m. Saturday and Sunday, except for official Hospital holidays. Studies are performed in the SLMT on a variable schedule. Otherwise, most medically urgent nuclear medicine services are available 24 hours/day, 7 days/week on an on-call basis and can be arranged by contacting the Nuclear Medicine Department (832-355-3126 during regular hours) or the Nuclear Medicine technologist or physician on call through the Hospital page operator (832-355-4146) outside of regular hours. Certain nuclear medicine procedures can be performed at the patient's bedside in the ICUs, but there are significant regulatory and technological restrictions on some of these studies. Because the quality of the study is usually much better when performed with fixed-base cameras in one of the Department's laboratories, "portable" or "bedside" studies should only be ordered when it is really medically necessary that the patient not be moved from the ICU. If the order for the study does not specifically indicate that the study is to be performed in the ICU, the patient will be brought to the Nuclear Medicine laboratory. A summary of available tests, indications, physiologic mechanisms, and patient preparations is available in the publication, "Nuclear Medicine Department Reference Manual," online via the SLEH "Source."

Reports and Consultations: Interpretations of SLEH/SLMT nuclear medicine studies are available on the day the study is completed. Reports completed during regular business hours 8-5, M-F) are available through the Hospital information system as soon as they are read (except during computer downtime). During regular business hours, reports are also available in the Nuclear Medicine Department office (Y2614) or by calling 832-355-2270. Reports completed after regular

hours are usually sent as faxed preliminary reports to the patients' nursing units and are therefore usually not in the Hospital's computer system until the following work day. Any physician with a question regarding nuclear medicine services in general or regarding a particular patient or clinical problem is encouraged to contact a Nuclear Medicine physician.

NUCLEAR MEDICINE DEPARTMENT CONTACTS

Main number.....	832-355-3126	Y2601
General Nuclear Medicine (26 th fl, SLEH).....	832-355-2272	Y2626
Cardiovascular Nuclear Medicine (3 rd fl, SLEH).....	832-355-3732	P327
Outpatient Nuclear Medicine (11 th fl, SLMT).....	832-355-8201	
Radiation Safety Office.....	832-355-3141	Y2601
Reports (8-5, M-F).....	832-355-2270	Y2614
Leticia Alanis-Williams, B.S.....	832-355-2692	Y2601A
Anupa Arora, M.D, MPH.....	832-355-5247	Y2618C
Randy Barker, B.S.....	832-355-8927	Y2660
Cindy Gentry, B.S.....	832-355-6448	Y2601D
Ramesh Dhekne, M.D.....	832-355-2608	Y2618E
Patrick Ford, M.D.....	832-355-2065	Y2618D
Ed Giles, M.S.....	832-355-4949	Y2621A
Marly Gonzalez, B.S.....	832-355-3806	P327
Bryan Fritz, B.S.....	832-355-4948	Y2611D
Joe Knisel, M.S.....	832-355-3884	Y2621B
Warren Moore, M.D.....	832-355-3126	Y2601B
Paul Murphy, Ph.D.,MBA.....	832-355-3440	Y2611C
Nayaka Shaw.....	832-355-4119	Y2601C

DEPARTMENT MISSION

The mission of the Nuclear Medicine Department of St. Luke's Episcopal Hospital is to provide high quality diagnostic, therapeutic, and consultative nuclear medicine services for patients and physicians at the Hospital and its Medical Tower and to promote the science and practice of nuclear medicine by providing educational opportunities for trainees in nuclear medicine and by participation in research involving the use of non-sealed sources of radioactive materials.

EDUCATIONAL SCOPE

The educational portion of the Department's mission specifically includes the education of health care providers and others in various aspects of nuclear medicine. In accomplishing this mission, members of the Service and the Department routinely participate in Baylor College of Medicine training programs for medical students, residents, and fellows and in the Houston Community College Nuclear Medicine Technology Program. From time to time, trainees from other institutions, private practitioners, commercial representatives, and members of the public may also be present in the Department and attend interpretation and other teaching sessions.

OVERVIEW OF CARDIAC NUCLEAR CARDIOLOGY TRAINING

American Board of Internal Medicine (ABIM) certification in Cardiovascular Diseases (CD) requires "competence in the interpretation of radionuclide procedures." For SLEH/THI Cardiology fellows, this is achieved by a combination of didactic lectures and practical training and experience. Goals, objectives, and curricula have been developed for each monthly nuclear cardiology rotation and will be reviewed with the fellow at the beginning of each rotation.

Didactic Lectures: The Core Lecture Series includes a brief overview of the most commonly used techniques in cardiac nuclear medicine including perfusion and functional imaging. Additional topics are covered over a 2-year cycle in the Nuclear Cardiology portion of the Noninvasive Cardiology (noon) lecture series.

Nuclear Cardiology 1: All fellows in the SLEH/THI Cardiology program complete two one-month rotations in the CVNM Laboratory. These collectively constitute the "Nuclear Cardiology 1" (Nuc 1) rotation. The exact timing of the rotations varies from fellow to fellow and may occur in the first and/or second year of the fellowship. Faculty review sessions are scheduled weekly during the Nuc 1 rotation. A structured text reading and written quiz schedule over both months is required. Practical experience in procedure performance and interpretation is also obtained during the rotation. This clinical rotation, in conjunction with didactic lectures, allows the fellow to develop an understanding of the applications, advantages, and pitfalls of radioisotope imaging as they apply to patients with known or possible cardiac disease. Together, these activities meet the requirements of (a) the Accreditation Council for Graduate Medical Education – Residency Review Committee for Cardiovascular Disease (ACGME-RRC-CD) for training of cardiology fellows in nuclear cardiology, (b) the American College of Cardiology (ACC) "COCATS 2" (2/2006 revision) Level 1 training for nuclear cardiology ("Basic (General) training required of all trainees to be competent consultant cardiologists" (and) "conversant with the field of nuclear cardiology for application in general clinical management of cardiovascular patients"), and (c) the ABIM for eligibility for the Cardiovascular Disease subspecialty examination. This level of training will not meet the requirements for authorized user status or licensure to use radioactive materials and will not provide eligibility for the Certification Board of Nuclear Cardiology (CBNC) examination.

Nuclear Cardiology 2: Fellows seeking authorized user (AU) physician status on a radioactive materials (RAM) license and/or CBNC certification will require additional training after completion of the Nuc 1 rotation. The portion of this additional training performed at SLEH is designated collectively as the "Nuclear Cardiology 2" (Nuc 2) rotation and includes a minimum of 3 additional one-month clinical rotations in CVNM, a research project, and certain other tasks described in detail in the Nuc 2 rotation manual. A didactic training course in basic sciences is also required but is not provided as a part of the Cardiology fellowship.

Any fellow who wishes to become an authorized user for radioactive materials (RAM) must achieve at least ACC Level 2 training ("Additional (Specialized) training in (nuclear cardiology) that enables the cardiologist to perform (and/or) interpret...specific procedures at an intermediate skill level...") and the fellow should contact the Director of CVNM (Dr. Warren Moore, 832-355-3126) no later than the spring of the first year of fellowship to discuss the requirements for such licensure. Official regulations vary from state to state and will definitely change between now and April 2008. These are subject to additional changes at any time. Current minimum requirements for licensure in Texas include at least 80 hours of didactic training (not provided by SLEH/THI) in basic sciences related to the use of nonsealed radioactive materials and approximately 620 hours of clinical training in the Nuclear Medicine Department (for a minimum total of 700 hours). This additional training that is required for RAM licensure is not a required part of the fellowship, and acceptance for such training is not guaranteed (due to space, personal performance, and other considerations). Five 1-month CVNM clinical assignments (Nuc 1 plus Nuc 2), a research project, and other local requirements exist for ACC Level 2 training at SLEH. Depending on federal and state guidelines, local requirements, and the fellow's exact rotation schedule, limits exist on leave and absences during nuclear medicine rotations. (For example, fellows seeking to meet Level 2 criteria should not plan to exceed a total of 15 days of absence (for any reason except clinic and post-call periods) during the five clinical months and should not plan to take more than 1 week of vacation or other leave during the fifth month. Fellows exceeding these limits may require additional clinical months to meet licensure hour requirements, and the availability of this training at SLEH is not guaranteed.

Nuclear Cardiology 3: Any fellow who wishes to pursue ACC Level 3 training ("Advanced training (which enables) a cardiologist to perform, interpret, and train others to perform and interpret specific procedures at a high skill level" (and is) "sufficient to pursue an academic career or direct a nuclear cardiology laboratory") will be required to complete 12 months of training in cardiac nuclear medicine. Fellows interested in this option should contact Dr. Moore as early as possible in the course of the fellowship to discuss this matter in detail. A maximum of one Level 3 position is available, and requests may come from inside or outside of Baylor.

PURPOSES

PURPOSES: There are two purposes for the Nuc I rotation in the CVNM Laboratory at SLEH: patient safety and trainee education.

1. The Nuc I Cardiology fellow, as the representative of the Cardiology Section, is responsible for the immediate medical safety of patients being examined in the CVNM Laboratory during regular hours. (After hours coverage is provided by the fellow covering the Cardiac Observation Unit (COU) or others.) This applies primarily to patients undergoing stress tests, but includes all patients who may be seen in the laboratory.
2. The Nuc I Cardiology fellow, as a trainee/learner in the Nuclear Medicine Department, has an opportunity and responsibility to learn about test procedures and clinical applications of cardiac nuclear medicine. The Baylor College of Medicine “Compact Between Teachers and Learners” is pertinent to this experience and is incorporated into these guidelines.

GENERAL GOALS

The goals of the Nuc 1 rotation are directed at the fulfillment of the purposes listed above. While patient safety is of great importance, knowledge and skills related to that part of the overall purpose of the rotation are under the auspices of the Cardiology Section and are addressed in many parts of the fellowship. Training in stress testing and management of general patient safety is therefore not a major educational focus of the nuclear medicine faculty during the rotation. Similarly, development of general cardiology background information (including but not limited to cardiac anatomy, physiology, and pharmacology), while integrated into daily discussions, is not an independent focus of this rotation. Accordingly, the goals and objectives of this rotation described below are heavily weighted toward practical and theoretical education in cardiac nuclear medicine.

GENERAL GOALS: It is generally expected that fellows will progressively develop knowledge, skills, and attitudes related to proper selection, performance, interpretation, and utilization of cardiac nuclear medicine imaging studies in clinical cardiology. The overall goal of this training is that all fellows will understand the basic principles of radioisotope imaging, how to choose the best radioisotope test to order to answer a specific clinical question for an individual patient, and how to apply the information contained in reports of cardiac nuclear medicine procedures to the care of individual patients.

Toward fulfillment of these general goals, the Nuc I rotation will:

1. provide training and experience so that the fellow can appropriately request radioisotope procedures for patients and so that the fellow can assess the quality and reliability of radionuclide procedures and interpretations performed by others
2. provide experience with radioisotope procedures as an adjunct to cardiac stress testing by various pharmacologic and exercise methods
3. meet the requirements of the ACGME-RRC-CD and ABIM-CD for training and board eligibility
4. provide training and experience necessary to pass radionuclide-related components of the ABIM-CD examination
5. meet ACC COCATS 2 (revised) Level 1 training criteria for radionuclide studies
6. meet, as far as possible in the time allowed, the recommendations developed by the Society of Nuclear Medicine (SNM) for basic training of cardiology fellows in radioisotope procedures.

SPECIFIC GOALS AND OBJECTIVES BY COMPETENCY

The specific educational goals and objectives for the Nuc 1 fellow on this rotation are indicated for each of the six ACGME competencies in the tables below. The first column describes whether the objective reflects knowledge, skill, and/or attitude. The second column lists the specific rotational objective. The third column lists the most relevant learning activities for that objective, and the fourth column indicates the principle evaluation methods for that objective.

In addition, the following legends are used to describe Traits, Learning Activities, and Evaluation Methods:

Traits	
K - Knowledge S - Skills	A - Attitude

Learning Activities	
FS – Faculty Supervision CC – Core Curriculum & didactic conferences DPC – Direct Patient Care MM – Morbidity and Mortality Conference	JC – Journal Club LR – Reading Assignment/Independent Literature Review RC – Research Conference CAC – Cath Conference

Evaluation Methods	
AE – Attending Evaluations PDR – Program Director’s Review (twice annually)	360 – 360° Evaluation Q - Quiz

1. Patient Care

Goal: At the end of this rotation, the fellow shall be able to provide patient care that is compassionate, appropriate, and effective for the evaluation known or suspected cardiac disorders by radionuclide techniques.

Traits	Objectives – By the end of the rotation, the fellow will be able to:	Learning Activities	Evaluation Methods
K,S	A. Obtain a focused medical history and physical examination to determine the safety and suitability of a requested procedure for an individual patient referred to the CVNM Laboratory	DPC, LR, CC, FS	AE
K	B. Assess the selection of stress tests, and select from common modifications of the requested stress test and/or the requested radionuclide imaging procedure if necessary for an individual patient, incorporating both pre-procedural and intra-procedural findings	DPC, LR, CC, FS	AE, Q
K,S	C. Monitor patients during and following stress testing to maintain patient safety and to treat expected and unexpected procedural complications	DPC, FS, CC, LR	AE
K,S	D. Discuss planned stress testing and radionuclide procedures with the patient and obtain informed consent for indicated testing	DPC, FS, LR, CC	AE, 360
K,S	E. Properly interpret results of radionuclide procedures with respect to an individual patient’s clinical situation and differential diagnosis and recommend additional testing and/or therapy as appropriate based on results of radionuclide procedures	DPC, AR/FS, LR, CC, JC	AE, Q

2. Medical Knowledge

Goal: At the end of this rotation, the fellow shall be able to demonstrate general knowledge of (i) basic sciences pertinent to cardiac radionuclide imaging, (ii) performance, quality control, and processing of clinical cardiac nuclear medicine procedures, (iii) basic interpretation of common cardiac nuclear medicine procedures, and (iv) appropriate clinical decision making using information obtained or likely to be obtained from cardiac nuclear medicine procedures.

Traits	Objectives – By the end of the rotation, the fellow will be able to:	Learning Activities	Evaluation Methods
K	A. Discuss the basic scientific principles of radiation, radionuclide imaging instrumentation and quality control, and clinical radiopharmacy	FS, CC, LR	AE, Q
K	B. Describe pharmacologic/physiologic principles and effects of radionuclide tracers used for cardiac imaging and of other medications commonly used in adjunctive roles with such imaging	FS, CC, LR	AE, Q
K	C. List radionuclide procedures available for assessment of known or suspected cardiac abnormalities, including common and less common procedures	FS, CC, LR	AE, Q
K	D. Discuss standard clinical indications, contraindications, and appropriateness criteria for radionuclide procedures; including planar, SPECT, and PET	FS, CC, DPC, LR	AE, Q
K	E. Describe key procedural and technical components of common radionuclide procedures, including patient preparation	FS, CC, DPC, LR	AE, Q
K	F. Recognize and describe technical and clinical situations that may affect the validity of cardiac nuclear medicine study results and describe techniques to avoid and/or overcome these problems	FS, CC, DPC, LR	AE, Q
K	G. Discuss basic principles of radiation safety and appropriate recommendations as they apply to patients undergoing diagnostic radionuclide cardiac procedures, to the public, and to personnel working in the hospital/clinic environment	FS, CC, DPC, LR	AE, Q
K	H. Provide basic interpretations of common radionuclide cardiac procedures; including common display formats, evaluation of technical quality of the study, variance from expected results, and comparison to other imaging modalities	FS, CC, DPC, LR	AE, Q

3. Interpersonal Skills and Communication

Goal: At the end of this rotation, the fellow shall be able to demonstrate the knowledge, skills and attitudes necessary to develop and maintain appropriate interpersonal relationships and to communicate effectively with patients, families, colleagues, and the public.

Traits	Objectives – By the end of the rotation, the fellow will be able to:	Learning Activities	Evaluation Methods
S,A	A. Communicate sensitively and effectively with patients and their families	FS, DPC	AE
S,A	B. Display willingness and ability to teach medical students, residents, nurses, technologists, and other ancillary personnel	FS, DPC	AE, 360
K,S	C. Synthesize clinical and laboratory information with radionuclide findings to form a clinically relevant and effective impression	FS, CC,DPC, LR, CAC	AE
K,S	D. Dictate appropriate reports including accurate, clear, concise, informative wording which has correct format, spelling, and grammar	FS, CC, DPC	AE
S,A	E. Demonstrate effective face-to-face and telephone skills of listening and speaking to professional colleagues and support personnel	FS, DPC	AE, 360
K,A	F. Demonstrate an understanding of the importance of notifying referring physicians of unexpected and/or urgent findings and of documenting this communication in the patient's record	FS, DPC	AE
K,S,A	G. Effectively and efficiently obtain informed consent from patients and/or family members as appropriate	FS, DPC	AE, 360

4. Professionalism

Goal: At the end of this rotation, the fellow shall be able to demonstrate the knowledge, skills, and attitudes necessary to practice professionally responsible, ethical, and compassionate care in the diagnostic imaging setting.

Traits	Objectives – By the end of the rotation, the fellow will be able to:	Learning Activities	Evaluation Methods
S, A	A. Interact professionally towards patients, families, colleagues, and all members of the health care team, showing respect, compassion, and integrity	FS, DPC	AE, 360
A	B. Display an appreciation of the social context of illness especially in patients undergoing diagnostic testing for known or suspected heart disease	FS, DPC	AE, 360
S,A	C. Provide mentoring and act as a role model for junior members of the care delivery team	DPC	AE, 360
K,S,A	D. Relate and fulfill the regulatory and ethical requirements to assure the confidentiality of all the private health information	FS, DPC	AE,360
A	E. Prepare for and attend assigned conferences and presentations	FS	AE
S,A	F. Demonstrate positive work habits, including punctuality and professional appearance	FS	AE, 360
S,A	G. Demonstrate intellectual curiosity and dedication to excellence	FS, CC, DPC, LR	AE
K,A	H. Recognize and avoid conflicts of interest in research, education, clinical practice, and private life	FS, DPC, RC	AE, 360

5. Practice-Based Learning and Improvement

Goal: At the end of this rotation, the fellow shall be able to demonstrate the knowledge, skills, and attitudes necessary to initiate and sustain self-directed and independent learning with emphasis on current evidence-based practice and evolving techniques relevant to radionuclide cardiac imaging and its related fields.

Traits	Objectives – By the end of the rotation, the fellow will be able to:	Learning Activities	Evaluation Methods
S,A	A. Demonstrate a commitment to professional scholarship through the systematic and critical perusal of current print and electronic medical literature, with an emphasis on the evaluation of information using principles of evidence-based medicine	DPC, FS, LR, JC, RC	AE
S	B. Utilize the Internet and other electronic media to find solutions to current clinical problems and questions.	DPC, JC, LR, RC	AE
K.S	C. Prepare interesting cases for presentation to colleagues to demonstrate typical or unique points of medical practice related to radionuclide imaging	FS, CC, DPC, LR	AE
K,S,A	D. Demonstrate the ability to recognize errors and to use them as opportunities to enhance his/her educational experience	FS, CC, DPC, JC, LR, RC	AE

6. Systems-Based Practice

Goal: At the end of this rotation, the fellow shall be able to demonstrate the knowledge, skills, and attitudes necessary to manage effectively in multiple, diverse, complex systems of care to provide effective service, supervision, and consultation for radionuclide cardiac imaging.

Traits	Objectives – By the end of the rotation, the fellow will be able to:	Learning Activities	Evaluation Methods
K,S	A. Propose an alternative policy, procedure, or method of operation for the CVNM Laboratory to improve the overall quality of the service provided by the Laboratory	DPC, FS	AE, 360
K,S,A	B. Discuss the role of referring physicians to the practice of radionuclide imaging and display a willingness and ability to help the requesting physician in a consultative capacity, according to the needs of the situation	DPC, FS	AE, 360
K	C. Know the costs and charges for common radionuclide cardiac procedures and understand the relationship of cost and charge in the business of imaging	DPC, FS	AE
K	D. Describe how imaging reports affect patient care, including medical, practical, and medico-legal implications	DPC, FS	AE
K,A	E. Discuss the concept of cost-effectiveness in the provision of health care to individuals and populations	DPC, FS, CAC, JC, LR,	AE

IMPLEMENTATION

In order to accomplish the above goals and objectives, the faculty of the SLEH Nuclear Medicine Service, in conjunction with the staff of the Nuclear Medicine Department, will provide daily educational activities through reading sessions, practical training and experience in the technical aspects of radionuclide procedures, and opportunities for the development of communicative and consultative skills in imaging. The trainee will be expected to:

1. Observe the performance of each type of CVNM procedure performed at St. Luke's Episcopal Hospital. Observation of selected common procedures should be documented on the attached forms as indicated.

The fellow should be able to describe the principal steps in these procedures and to discuss the reasons for each step and to describe possible alternatives required by various patient circumstances.

2. Personally monitor during the first week of the rotation (if not already completed in other rotations) (a) a minimum of 5 patients undergoing treadmill stress and (b)
3. of 5 patients undergoing dipyridamole infusion. and (C) Five patients undergoing dobutamine stress in conjunction with radioisotope imaging, if available, should be monitored during the first month. (Monitoring Log attached.)

Personally observe and document, throughout the rotation, any patient in the CVNM Laboratory undergoing bicycle stress (MUGA) imaging, first-pass imaging, or adenosine infusion. (Monitoring Log attached)

4. Participate in and document (forms attached) hands-on activities involving radiopharmaceutical administration, imaging procedure, data processing, and radiation safety.

The fellow should contact the CVNM Technologist Supervisor to arrange for these activities.

4. Participate in daily reading sessions with the nuclear medicine physician.

Reading sessions should take precedence over other activities except for immediate patient care concerns for patients in the CVNM or Treadmill laboratories, mandatory conferences of the Cardiology Section, and required cardiology clinic and call responsibilities.

5. Participate in education and research related to cardiac nuclear medicine.

During or following the second month of the rotation, the fellow may present a noon conference for the Cardiology Section on a topic related to cardiovascular nuclear medicine. The fellow must ascertain the exact date of this presentation from the Chief Fellow. The topic of this conference will be assigned by the Director of CVNM and should be discussed with him prior to initiating major effort.

Each fellow is encouraged (but not required) to undertake a research project in cardiovascular nuclear medicine during his CVNM rotations. This project should be selected in consultation with the Director of CVNM. The ultimate goal of this project should be the presentation of results in an abstract and/or published paper.

6. Though not a requirement of this rotation, fellows who plan to seek further training for RAM licensure may wish to begin to satisfy some of the other "hands-on" requirements listed in the curriculum of the Nuc II rotation (attached.) Maintaining a log of all studies interpreted is required by the ACC, (sample forms are attached).

CLINICAL SUPERVISION

Trainees rotating at SLEH will be subject to all regulations of BCM and SLEH. The Chief of the Nuclear Medicine Service has overall responsibility for resident and fellow education and experience in the SLEH Nuclear Medicine Department and has delegated responsibility for Cardiology fellow training to the CVNM Director. Other faculty members of the Nuclear Medicine Service also participate on a daily basis as supervising physicians as assigned by the Chief of Service.

Each trainee will be given progressive opportunity and responsibility, commensurate with his/her abilities as determined by the attending staff, for the operation of the daily activities of the CVNM laboratory. The trainee is encouraged to take responsibility for decisions, but should not exceed his/her level of competence. A member of the faculty will be available at all times to assist with decisions and make appropriate suggestions or to give direction as appropriate.

CLINICAL RESPONSIBILITIES

The following clinical responsibilities are an outgrowth of the purposes, goals, and objectives. If the trainee needs any assistance in these processes, he/she should immediately contact the appropriate supervising physician.

1. Except as described below, the Nuc I fellow should be physically present in the CVNM or SLEH Treadmill laboratory at all times that patients are undergoing stress tests and until each stress patient is suitable for discharge from the laboratory. If the fellow is to be anywhere other than the CVNM Laboratory or the SLEH Treadmill Laboratory, he/she must be certain that such absence will not interfere with the operation of the laboratory. In arranging coverage by another fellow, the fellow assigned to CVNM must make the covering fellow aware of all pertinent guidelines and must make the CVNM Supervisor or her designee aware of the coverage arrangement.
2. All trainees assigned to the CVNM laboratory are collectively responsible for participation in daily activities of that laboratory. Unless otherwise directed by these guidelines or by a Nuclear Medicine faculty member, The Nuc 1 fellow will have primary responsibility for patient monitoring and safety. Distribution of other activities among the trainees will be determined by the Cardiology fellow assigned as clinical supervisor for the day. If no such designation has been made, assignments will be made by the most senior fellow on the rotation or by the Chief Fellow.
3. In accordance with Hospital and Cardiology Section guidelines, the fellow should review pre-stress data of all patients prior to exercise testing/pharmacologic infusion. Patients should be screened for appropriateness and contraindications to the stress test for which they are scheduled. Any adjustment to the requested form of stress must be approved by the fellow in accordance with Cardiology Section policies and documented in accordance with Hospital policies. In the event of adverse reaction or other patient problem, the fellow will direct patient care until disposition from the CVNM Laboratory has been completed.

The fellow will generally supervise the activities of physiologists, nurses, technologists, or other personnel involved in the conduct of stress tests and other patient interactions. Urgent patient care matters will be handled at the direction of the fellow. Issues and problems related to stress testing and clinical cardiology issues should be discussed with the referring physician and/or with the Medical Director of Non-invasive Cardiology (Dr. Ray Stainback) or his designee.

The fellow will see that any medication (except radiopharmaceuticals and pharmacologic stress agents) administered in the CVNM Laboratory and any serious adverse effects are appropriately documented in the Nuclear Medicine abstract sheet and also (for inpatients) in the patient's chart.

According to Cardiology Program guidelines, the Nuc I fellow or his substitute is to be available to supervise stress tests by 0800 Monday-Thursday and 0845 on Friday (when the fellow is attending the regularly scheduled Cardiology conference), except for Hospital holidays. Patients ready to stress by 1145 must be handled prior to leaving for noon conference. Coverage for end-of-day stress tests is described elsewhere in this manual.

4. The fellow will provide a preliminary interpretation of EKGs for patients studied in the Noninvasive Cardiology/CVNM laboratories, as directed by the Director of Non-Invasive Cardiology.
5. Before the reading session each day, and at other times as directed by the supervising physician, the trainee should review the available completed studies and a report in the scan report computer (PowerScribe®) for final review by the supervising physician. In addition to an interpretation of a scan, the trainee should be able to answer questions (with the aid of the clinical abstract) regarding the clinical diagnosis or diagnoses, the

differential diagnosis in general, and the role of the radionuclide study in the patient's workup. (Further details are included in Objectives above.)

6. The fellow may be asked to present appropriate CVNM cases at the morning Noninvasive Cardiology Conference. This presentation involves operation of the necessary audiovisual equipment and general familiarity with the cases. Cases selected will be those considered to be of particular interest or teaching value.
7. Each trainee will prepare 2 cases for the Department's CVNM Teaching File during each rotation. The purpose of this task is to give the trainee experience in formal follow-up of interesting studies with particular attention to the role of radionuclides in a patient's overall evaluation. An obvious offshoot of this activity will be an improved departmental teaching file which will be available to all trainees. The cases prepared may be current or previous studies performed at SLEH and may demonstrate a typical or unusual manifestation of a disease process, a physiologic or technical artifact, or other interesting results of radionuclide administration. Cases to be prepared should be approved by Dr. Warren Moore. Preparation will include selection, coding, and collection of all pertinent clinical and supporting data to document the final diagnosis or finding. Correlative imaging studies are always encouraged and usually required. A brief paragraph describing why the case is in the teaching file should also be prepared. Completed cases are submitted to Dr. Moore in Powerpoint® format before the end of the monthly rotation.
8. Questions, issues, and problems related to imaging issues for a specific patient procedure or situation should be discussed with the Nuc II fellow and/or the nuclear medicine physician assigned to the CVNM Laboratory for the day.
9. General administrative issues, problems, and recommendations for policy or procedure changes should be discussed with the CVNM Director.

CLINICAL DOCUMENTATION

Documentation is required in Nuc 1 rotations for attendance, case participation/interpretation, and "hands-on" activities listed on the following forms. Fellows who are considering Level 2 or Level 3 training should also consider beginning documentation of those more extensive requirements. Forms are attached for recording the necessary data. All required documentation should be returned to the Director of CVNM at the end of the fellow's nuclear medicine rotations.

Attendance will be documented by the "Trainee Attendance Log" posted in the CVNM reading room. The fellow should indicate his/her hours of participation only in nuclear medicine activities at the end of each day. (Time spent in other activities such as personal activities; non-nuclear study, conferences, and review sessions; cath lab; clinic; and general call activities do not count for the purposes of this log.) In the case of absence or limited attendance, the reason for should be recorded on the day the fellow returns to duty. If the fellow fails to complete this log, he/she will be assumed not to have been present for the day.

EDUCATIONAL RESPONSIBILITY

While the faculty is responsible for coordinating and directing each trainee's experience and while faculty members may receive a "return" from this activity in various ways, it is the learner who will chiefly benefit from the rotation. Therefore, though the fellow is not expected to master the entire field of cardiac nuclear medicine in the course of the Nuc 1 rotation, each fellow must develop a reasonable fund of information and a working knowledge of the field. Fellows' activities must include completion of assigned projects and additional reading as necessary to gain an understanding of the basic principles and key specifics of clinical cardiac nuclear medicine and related basic sciences. Initiative and active involvement on the trainee's part are expected.

READING/EXAMINATION

To assist the fellow in accomplishing the goals and objectives above, a formal reading and examination program has been designed. Designated reading assignments are attached. Additional information may be available from the nuclear medicine staff, but is not a substitute for the primary assignments. A copy of the required reading materials is available to be checked out from the Nuclear Medicine Department Library (see the Department secretary in Room Y2601), in the THI Learning Resource Center, and in the TMC Jesse Jones Library. Materials checked out from the Nuclear Medicine Department are to be returned to the Nuclear Medicine secretary by the last day of the rotation. (DO NOT just pass the materials to the next fellow.)

An optional review period will be held at 0700 on Thursdays (unless another date has been arranged with the CVNM Director). During this review, a Nuclear Medicine attending physician will address specific questions developed by the fellow, derived from the weekly reading assignment and clinical experiences. The Nuc I fellow must contact Dr. Moore (before Thursday) if he/she is not planning to attend that week's review session.

On Friday, the fellow will take a written (usually essay style) examination lasting approximately 30 minutes covering the material of all preceding weeks with emphasis on the most recent assignment. After scoring, the examination material will be discussed with the fellow at the following Thursday review. A minimum score of 70% is considered passing.

EVALUATION

At the end of the each 1-month rotation, the fellow will be evaluated using standard forms provided by the Cardiology Section. The evaluation form will not be submitted until all checked out materials have been returned.

During the last week of the rotation, the fellow will meet with the Director of CVNM to verbally review the fellow's performance and the quality of the rotation. The fellow will also be asked to verbally evaluate the CVNM rotation for the purpose of improving the experience for future trainees. Comments regarding the rotation are welcome at any time and should be directed to the Director of CVNM or to the Cardiology Program Director. In evaluating the rotation formally or informally, specific remarks are more valuable than vague generalities.

ADMINISTRATIVE ISSUES

In addition to the general regulations required by Baylor College of Medicine and those required by the Cardiology Program Director, the following rules shall apply.

Attendance: The trainee is expected to be in the CVNM Laboratory or the SLEH Treadmill Laboratory during the routine hours of operation of the assigned laboratory, as described below, unless the trainee has made previous arrangements with the SLEH Chief of Service or the Nuclear Medicine physician responsible for the laboratory for the time of absence. The fellow is automatically excused for the half-day associated with his/her continuity clinic.

Starting: Except as described above, trainees should report to the CVNM Laboratory no later than 0800 Monday-Friday with the exception of (a) official holidays of St. Luke's Episcopal Hospital when the Laboratory is closed and (b) Fridays when the fellow attends Basic Science Conference and is required in the CVNM Laboratory no later than 0845, or (c) days on which the trainee had official in-house night call the previous evening in which case he/she is excused for the day.

Absence During the Day: Every effort will be made to adjust the laboratory's clinical schedule so that the fellow can be excused for attending officially sanctioned midday SLEH Cardiology conferences, Cardiac Pathology Conference, and official evening cardiology conferences. If there is a special consideration, such as a conference that the fellow is presenting, the CVNM Technologist Supervisor should be notified early in the day to optimize scheduling, and backup coverage, if necessary, must be arranged by the fellow. Backup coverage should usually be the Nuc II fellow, but since that fellow may have conflicting commitments, coverage cannot be assumed without making specific arrangements. Backup coverage also applies if a fellow is required to present at the morning Noninvasive Cardiology Conference

Finishing: The CVNM Laboratory usually completes its daily work between 1700 and 1800 but may be earlier or later on any particular day. The fellow should be present until all cardiac procedures have been completed and interpreted unless (a) the fellow is in continuity clinic, (b) the fellow has CCU night call for the evening, in which case he/she will be excused at 1630 if needed for call duties, (c) the fellow had CCU or CHO night call (not moonlighting) the previous evening in which case he/she is excused for the day, (d) the fellow has made previous formal arrangements with the Program Director and Director of CVNM for other absence (leave), or (e) the fellow is excused by the Nuclear Medicine attending responsible for the Laboratory that day. In any case (including a-e above) in which the fellow is to be excused from the laboratory before the completion of the day's stress testing and patient recovery, the Nuc I fellow must arrange alternative coverage. This coverage will usually be by the Nuc II fellow. If the Nuc II fellow is unavailable, the Nuc I fellow should arrange with the Chief Fellow for coverage.

Leave and Absences: The Director of CVNM should approve all requests for formal leave or other substantial absence from the rotation. Any replacement coverage for these absences must be arranged by the fellow and described in writing on the form provided by the Program Director.

In the event of illness or other unavoidable urgent absence, the fellow should contact the Chief Fellow or his/her designee as soon as possible in order to arrange for alternative clinical coverage. In addition, the fellow should notify the CVNM Laboratory at 832-355-3732 of the situation and coverage.

Radiation Safety: Fellows will wear the Hospital-issued radiation detection badge at all times while in the CVNM Laboratory.

QUESTIONS/COMMENTS

All questions regarding the curriculum and general or specific guidelines contained in this packet and any comments or suggestions regarding the operation of the CVNM Laboratory should be referred to the Director of CVNM, Warren H. Moore, M.D., at 832-355-3126 or wmoore@sleh.com (Room Y2601B, SLEH).

NUCLEAR CARDIOLOGY I (CVNM) READING ASSIGNMENTS

- Week 1: Introduction/Myocardial Perfusion Imaging 1
 -Gerson: Ch 6 & 4
 *Heller: Ch 1, 2, 9, 10, 14
- Week 2: Myocardial Perfusion Imaging 2
 -Gerson: Ch 1, 3, & 20
 *Heller: Ch 3, 11, 12, 13, 19
- Week 3: Myocardial Perfusion Imaging 3
 -Gerson: Ch 2, 5
 *Heller: Ch 4, 5, 6, 7
 *Chandra: pp160-167, 168-175
- Week 4: Basic Nuclear Medicine Physics & Instrumentation
 -Chandra: pp 1-30, 31-49, 110-127, 128-138, 139-157
 *Heller: Ch 21, 22
- Week 5: Gated Imaging: Resting and Exercise Studies
 -Gerson: Ch 10 & 11, 12-17
 *Heller: Ch 8, 23
- Week 6: Positron Imaging
 -Gerson: Ch 8 & 9
 -Chandra: pp 157-159
- Week 7: Infarct/Acute-Use Imaging
 -Gerson, Ch 18, 26
 *Berman, Ch 6
 *Heller: Ch 7
- Week 8: Other Clinical Applications
 *Heller: Ch 20 & 24
 *Gerson, Ch 22 & 25, 7, 21, 24, 27, 28, 29
 *Berman, Ch 12-16

References

1. Berman & Mason, Clinical Nuclear Cardiology, Grune & Stratton, 1981.
2. Chandra, Nuclear Medicine Physics-The Basics, 6th ed., Williams & Wilkins, 2004.
3. Gerson, Cardiac Nuclear Medicine, 3rd ed., McGraw-Hill, 1997.
4. Heller & Hendel, Nuclear Cardiology Practical Applications, McGraw-Hill, 2004.

Items marked with an asterisk () are optional for Nuc I fellows.

CARDIAC NUCLEAR MEDICINE TRAINING – TYPICAL DAILY SCHEDULE – NUC 1

Nuc I fellows are generally expected to be present in the immediate area of the CVNM Laboratory from 0800 to 1800 each weekday except when actively participating in the following activities:

<u>Time</u>	<u>Day</u>	<u>Activity</u>
0730-0845	F	Basic Science Conference
1145-1315	M-F	Cardiology Noon Conference
1550-1710	Th	Cardiac Pathology Conference
a.m. or p.m.	varies	Continuity Clinic
1630-0700	varies	On-Call Duties
all day	varies	Post-Call Day

The Nuc 1 fellow may be needed in the Laboratory during or outside of these times under certain circumstances as described in the curriculum manual. CVNM activities on Hospital holidays and on weekends are not a part of the Nuc 1 rotation. Considering the allowances noted above, a typical daily schedule for Nuc 1 fellows would be:

Month 1

<u>Month 1</u>			<u>Clinical Activities</u>
Mon	0800-1145	Clinical Nuclear Medicine	Oversee Patient Care and Safety
	1145-1315	Cardiology Noon Conf.	Basic Clinical Reading Assignments
	1315-1800	Clinical	Observe & Monitor Patient Studies
Tu-W	0800-0900	Clinical	Observe Each Type of Imaging Study
	0900-1145	Clinical	Observe and Perform Basic Image Processing
	1145-1315	Cardiology Noon Conf.	Observe Image QC
	1315-1800	Clinical	Interpretation Sessions
Thurs	0700-0750	CVNM Review	Consider Research Project
	0800-0900	Clinical	
	0900-1145	Clinical	
	1145-1315	Cardiology Noon Conf.	
	1315-1550	Clinical	
	1550-1710	Cardiologic Pathology Conf.	
Fri	1710-1800	Clinical	
	0730-0845	Basic Science Conf.	
	0845-1145	Clinical	
	1145-1315	Cardiology Grand Rounds	
	1315-1800	Clinical	

Month 2

<u>Month 2</u>			<u>Clinical Activities</u>
Mon	0800-1145	Clinical Nuclear Medicine	Oversee Patient Care and Safety
	1145-1315	Cardiology Noon Conf.	Basic Clinical Reading Assignments
	1315-1800	Clinical	Observe & Monitor Patient Studies
Tu-W	0800-0900	Clinical	Observe Each Type of Imaging Study
	0900-1145	Clinical	Observe and Perform Basic Image Processing
	1145-1315	Cardiology Noon Conf.	Observe Image QC
	1315-1800	Clinical	Administer Tracer Doses to Patients
Thurs	0700-0750	CVNM Review	Interpretation Sessions
	0800-0900	Clinical	Consider Research Project
	0900-1145	Clinical	
	1145-1315	Cardiology Noon Conf.	
	1315-1550	Clinical	
	1550-1710	Cardiologic Pathology Conf.	
Fri	1710-1800	Clinical	
	0730-0845	Basic Science Conf.	
	0845-1145	Clinical	
	1145-1315	Cardiology Grand Rounds	
	1315-1800	Clinical	

**ST. LUKE’S EPISCOPAL HOSPITAL – NUCLEAR MEDICINE DEPARTMENT
 TRAINEE PARTICIPATION LOG for CARDIAC ACTIVITIES**

Trainee: _____

The following activities are required for Cardiology fellows during clinical Nuclear Medicine rotations. (These activities are optional for Diagnostic Radiology and Nuclear Medicine residents at SLEH.) Nuc 1 rotations include 2 mandatory 1-month rotations in CVNM for Cardiology fellows. Nuc 2 rotations include 3 elective 1-month rotations in CVNM. All Nuc 1 and Nuc 2 activities listed here (plus other requirements of CBNC) must be completed prior to obtaining a letter of eligibility from the Director of CVNM for the CBNC examination.

Cases listed in “observation” and/or “processing” categories may also be included in other categories such as Radiopharmacy or Imaging Practicum if all criteria are met for each category.

Lines under “NMT” must be initialed by the technologist supervising the activity. Lines under “NM MD” must be initialed by the supervising attending NM physician. All initials should be obtained on the day the task is completed.

NUC 1 ACTIVITIES (ACC Level 1)

These activities are required at SLEH for ACC Level 1 training. Performance of these activities is assumed prior to beginning ACC Level 2 training.

1. Procedure Observation/Participation

- A. During the first week of the first rotation, observe the entire study (including rest and stress radiopharmaceutical injection, stress test, rest and stress imaging, and processing) for 2 patients undergoing myocardial perfusion imaging with treadmill exercise (TMT/MPI). Review cases with NM MD.

	Date	Pt. ID#	R-Inj	R-Img	S-Inj	S-Img	Process	NM MD
1)	_____	_____	_____	_____	_____	_____	_____	_____
2)	_____	_____	_____	_____	_____	_____	_____	_____

- B. During the first week of the first rotation, observe the entire study (including rest and stress radiopharmaceutical injection, stress test, rest and stress imaging, and processing) for 2 patients undergoing dipyridamole/MPI or adenosine/MPI. Review cases with NM MD.

	Date	Pt. ID#	R-Inj	R-Img	S-Inj	S-Img	Process	NM MD
1)	_____	_____	_____	_____	_____	_____	_____	_____
2)	_____	_____	_____	_____	_____	_____	_____	_____

- C. Observe stress test, radiopharmaceutical administration, and post-stress imaging procedure for two patients undergoing dobutamine/MPI

NMT	Date	Pt ID#	Occurrences
1)	_____	_____	_____
2)	_____	_____	_____

- 2. B. Under direct supervision of a NM Technologist, perform basic image processing of 5 patients undergoing radionuclide angiography (MUGA) and review the quality of this processing with the NM attending at the daily reading session

MD	Date	Pt. ID#	Study Type	Occurrences	NMT	NM
1)	_____	_____	_____	_____	_____	_____
2)	_____	_____	_____	_____	_____	_____
3)	_____	_____	_____	_____	_____	_____
4)	_____	_____	_____	_____	_____	_____
5)	_____	_____	_____	_____	_____	_____

3. Radiation Safety Practicum

- A. Accompany Radiation Safety Officer and/or Radiation Safety Technician on rounds to monitor compliance with Radiation Protection Plan. Include QC check of survey meters. (2 days)

	Date	Occurrences	RS
1)	_____	_____	_____
2)	_____	_____	_____

4. Image Interpretation Log

(ACC requires that fellows maintain a log of at least 300 studies interpreted if seeking Level 2 training.)
Use patient stickers or write in information.

<u>Date</u>	<u>Patient ID</u> MD	<u>Test</u>	NM
1) _____	_____	MPI: Tc TI MUGA Other: _____	
2) _____	_____	MPI: Tc TI MUGA Other: _____	
3) _____	_____	MPI: Tc TI MUGA Other: _____	
4) _____	_____	MPI: Tc TI MUGA Other: _____	
5) _____	_____	MPI: Tc TI MUGA Other: _____	
6) _____	_____	MPI: Tc TI MUGA Other: _____	
7) _____	_____	MPI: Tc TI MUGA Other: _____	
8) _____	_____	MPI: Tc TI MUGA Other: _____	
9) _____	_____	MPI: Tc TI MUGA Other: _____	
10) _____	_____	MPI: Tc TI MUGA	

Other: _____

5. Procedure Monitoring Log

Documentation of the monitoring of stress tests is optional for Nuclear Medicine rotations. Such documentation is strongly recommended by the ACC. The form below is provided should the fellow wish to use it.

	Date	Pt ID#	Occurrences
A. Treadmill	1)	_____	_____
	2)	_____	_____
	3)	_____	_____
	4)	_____	_____
	5)	_____	_____
B. Dipyridamole	1)	_____	_____
	2)	_____	_____
	3)	_____	_____
	4)	_____	_____
	5)	_____	_____
	6)	_____	_____
	7)	_____	_____
	8)	_____	_____
	9)	_____	_____
	10)	_____	_____
<hr/>			
C. Dobutamine	1)	_____	_____
	2)	_____	_____
	3)	_____	_____
	4)	_____	_____
	5)	_____	_____

5.D. Adenosine 1) _____

2) _____

3) _____

4) _____

5) _____

6) _____

7) _____

8) _____

9) _____

10) _____

E. First Pass 1) _____

2) _____

3) _____

4) _____

5) _____

F. Stress MUGA 1) _____

2) _____

3) _____

4) _____

5) _____

G. Misc. 1) _____

2) _____

3) _____

4) _____

5) _____

**ST. LUKE'S EPISCOPAL HOSPITAL – NUCLEAR MEDICINE DEPARTMENT
 TRAINEE PARTICIPATION LOG for CARDIAC ACTIVITIES**

Trainee: _____

“Nuc 2 Activities” are required at SLEH for ACC Level 2 certification. They can be accomplished within the clinical rotation time allotted for Nuc 2 rotations, but may be initiated during Nuc 1 rotations. Trainees not seeking Level 2 training may participate in Nuc 2 activities during their Nuc 1 rotations, but are not required to do so. All Nuc 1 and Nuc 2 activities listed here (plus other requirements of CBNC) must be completed prior to obtaining a letter of eligibility from the Director of CVNM for the CBNC examination.

These activities need not be performed in the order presented. However, trainees performing any activity are expected to understand the principles involved in addition to the technical tasks. Thus, some activities are more appropriately performed after the related didactic course section has been completed.

Cases listed in “observation” and/or “processing” categories may also be included in other categories such as Radiopharmacy or Imaging Practicum if all criteria are met for each category.

Lines under “NMT” must be initialed by the technologist supervising the activity. Lines under “NM MD” must be initialed by the supervising attending NM physician. All initials should be obtained on the day the task is completed.

NUC 2 ACTIVITIES (ACC Level 2)

In addition to Items 1-5 described in Level 1 documentation:

6. Radiopharmacy Practicum

- A. Prior to participation in items 6.B-H, review the Radiopharmacy Policy and Procedure Manual, with particular attention to the use of administrative controls and procedures for maintaining an ALARA radiation environment for patients, radiation workers, and the public and for preventing radiation-related medical events. Items 6.B-G will usually be performed in the 26th floor radiopharmacy; items 6.H-I may be performed in any of the Department’s laboratories.
- B. (26th floor radiopharmacy) Under the direct supervision of a NM Technologist, observe and participate in routine radiopharmacy procedures (minimum 5 days). In addition to the specific tasks listed below, radiopharmacy participation on Day 1 in the pharmacy must include discussion of administrative controls and techniques for preventing, containing, and decontaminating spills of unsealed radioactive materials.

	Date	Time	NMT		Date	Time	NMT
1)	_____	_____-_____	_____	6)	_____	_____-_____	
2)	_____	_____-_____	_____	7)	_____	_____-_____	
3)	_____	_____-_____	_____	8)	_____	_____-_____	
4)	_____	_____-_____	_____	9)	_____	_____-_____	
5)	_____	_____-_____	_____	10)	_____	_____-_____	

- 2) _____
- 3) _____
- 4) _____
- 5) _____
- 6) _____
- 7) _____
- 8) _____
- 9) _____
- 10) _____

6. H. Using appropriate verifications and techniques, under direction supervision of a NM Technologist, calculate and prepare radiopharmaceutical doses from kits for patient administration. (5 doses)

	Date	Rph Type	Dosage	Occurrences	NMT
1)	_____	_____	_____	_____	_____
2)	_____	_____	_____	_____	_____
3)	_____	_____	_____	_____	_____
4)	_____	_____	_____	_____	_____
5)	_____	_____	_____	_____	_____

I. Radiopharmaceutical Injection: After reviewing the Radiopharmaceutical Administration Policy and using appropriate verifications and injection techniques (including syringe shields), under direction supervision of a NM Technologist, inject radiopharmaceutical (5 injections).

	Date	Patient ID#	Rph.	Dosage	Occurrences	NMT
1)	_____	_____	_____	_____	_____	_____
2)	_____	_____	_____	_____	_____	_____
3)	_____	_____	_____	_____	_____	_____
4)	_____	_____	_____	_____	_____	_____
5)	_____	_____	_____	_____	_____	_____

8. QC Practicum

A. Observe daily quality control acquisition and assessment for a SPECT camera (3 days)

	Date	Camera	Occurrences	NMT
1)	_____	_____	_____	_____
2)	_____	_____	_____	_____
3)	_____	_____	_____	_____

B. Observe acquisition and assessment of bar phantom image (2 days)

	Date	Camera	Occurrences	NMT
1)	_____	_____	_____	_____
2)	_____	_____	_____	_____

C. Observe acquisition and assessment of center of rotation determination (2 days)

	Date	Camera	Occurrences	NMT
1)	_____	_____	_____	_____
2)	_____	_____	_____	_____

D. Observe acquisition and assessment of SPECT phantom image (1 day)

	Date	Camera	Occurrences	NMT
1)	_____	_____	_____	_____

E. Observe daily quality control acquisition and assessment for a SPECT/CT camera (3 days)

	Date	Camera	Occurrences	NMT
1)	_____	_____	_____	_____
2)	_____	_____	_____	_____
3)	_____	_____	_____	_____

9. Radiation Safety Practicum

- A. Review the radioactive materials license of St. Luke's Episcopal Hospital.
- B. Review the Radiation Safety Manual of St. Luke's Episcopal Hospital.
- C. Review pertinent sections of 10 CFR 35 with respect to imaging procedures. (This may be accomplished during the didactic basic sciences instruction.)
- D. In addition to Item 3 above, accompany the Radiation Safety Officer and/or Radiation Safety Technician on rounds to monitor compliance with the Radiation Protection Plan (2 days)
 - 1. Assist in performance of wipe tests for assessment of removable contamination.
 - 2. Perform area surveys for contamination.
 - 3. Survey and review records of trash and waste stored for decay.
 - 4. Review records of the receipt and disposal of radiopharmaceutical doses.

Date	Occurrences	RS
_____	_____	_____
_____	_____	_____

10. Image Interpretation Log (Continuation from Nuc 1)

(ACC requires that fellows maintain a log of at least 300 studies interpreted if seeking Level 2 training.)
Use patient stickers or write in information.

<u>Date</u>	<u>Patient ID</u> MD	<u>Test</u>	NM
1)	_____	MPI: Tc Tl MUGA Other: _____	
2)	_____	MPI: Tc Tl MUGA Other: _____	
3)	_____	MPI: Tc Tl MUGA Other: _____	
4)	_____	MPI: Tc Tl MUGA Other: _____	
5)	_____	MPI: Tc Tl MUGA Other: _____	
6)	_____	MPI: Tc Tl MUGA Other: _____	
7)	_____	MPI: Tc Tl MUGA Other: _____	
8)	_____	MPI: Tc Tl MUGA Other: _____	
9)	_____	MPI: Tc Tl MUGA Other: _____	
10)	_____	MPI: Tc Tl MUGA	

Other: _____

NUCLEAR MEDICINE CASE CORRELATION (30 cases required for ACC Level 2 training)

PT. NAME: _____ MR#: _____ REF

MD: _____

PT. AGE: _____ SEX: _____ HT: _____ WT: _____ CHEST: _____

STUDY DATE: _____ NM MD: AKA RDD PVF WHM TRAINEE:

NM TEST TYPE: MPI/Tc MPI/TI MUGA PYP

Other _____

Rest-Only Rest/Redist. Rest/Reinjection Rest/Reinj/Redist. Stress-Only Rest/Stress Stress/Rest
STRESS TYPE: Bruce TM Other TM BIKE DIP ADEN DOB Other

STRESS DURATION: _____ METS: _____ EVENTS: _____

REASON FOR STOPPING: _____

RADIOPHARMACEUTICAL: TL-201 MIBI TETRO RBC PYP

Other _____

CATH DATE: _____ ECHO DATE: _____ MRI DATE: _____ CCT DATE:

Clinical History & Lab Results:

Pretest likelihood of CAD: _____ Reason for NM Test:

NM Study Quality: Good Fair Poor If not Good, why?:

NM Findings Summary (also attach NM report):

Echo Findings: LVEF: _____; _____

MRI Findings: LVEF: _____; _____

CCT Findings: _____

Cath Findings (also attach cath report/diagram):

CAD: Y N LVEF: _____ CMP: Y N L-Dom R-Dom Co-Dom Ramus

Stenosis: LMain _____% LAD _____% Ramus _____% LCX _____% OM1 _____% OM2 _____% RCA _____%
PDA _____%

Other Findings:

Did the NM results match the cath findings? YES NO If not, why not?

What effect did the NM test have on the patient's management?

TO : Dr. _____

Adult Cardiology, MC1-102
St. Luke's Episcopal Hospital
6720 Bertner Avenue
Houston, TX 77030

RE: Nuclear Cardiology Rotation

Dear Dr. _____:

You are scheduled to rotate next month on the SLEH Nuclear Medicine Service ("Nuc 1" Rotation). The attached *Rotation Manual for Cardiovascular Nuclear Medicine (Nuc 1)* has been prepared to give you a thorough understanding of the goals and expectations of that rotation. Please review this guide prior to beginning your rotation.

Unless you hear otherwise from me directly, I will meet with you during the morning of the first day of the rotation to review the goals, objectives, and responsibilities for the rotation and to answer any questions that you have.

If you have any questions regarding the rotation or these materials prior to starting the rotation, you may contact me at 832-355-3126 or via the page operator (beeper 26432).

Sincerely,

Warren H. Moore, M.D., FACNP, FACC
Chief, Nuclear Medicine Service
Director, Cardiovascular Nuclear Medicine

TO : Dr. _____

Adult Cardiology, MC1-102
St. Luke's Episcopal Hospital
6720 Bertner Avenue
Houston, TX 77030

RE: Nuclear Cardiology Rotation

Dear Dr. _____:

You are scheduled to rotate next month on the SLEH Nuclear Medicine Service ("Nuc 1" Rotation).

Unless you hear otherwise from me directly, I will meet with you during the morning of the first day of the rotation to review the goals, objectives, and responsibilities for the rotation and to answer any questions that you have. Please bring any documentation you have for "hands-on" activities that you completed during your first Nuc 1 rotation to our meeting on that day.

If you have any questions regarding the rotation or these materials prior to starting the rotation, you may contact me at 832-355-3126 or via the page operator (beeper 26432).

Sincerely,

Warren H. Moore, M.D., FACNP, FACC
Chief, Nuclear Medicine Service
Director, Cardiovascular Nuclear Medicine