Overview of Rotation
Revision Date: February 1, 2016

I. GENERAL INFORMATION

<table>
<thead>
<tr>
<th>Name of Rotation</th>
<th>Nuclear cardiology</th>
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<tbody>
<tr>
<td>Director</td>
<td>Raymond Russell, M.D.</td>
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<tr>
<td>Duration of Rotation</td>
<td>1 month</td>
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<td>Location</td>
<td>RI Hospital</td>
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<tr>
<td>Administrative/Secretarial Contact &amp; Phone</td>
<td>Jane Freer, 444-8689</td>
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<tr>
<td>Location to report on first day of rotation</td>
<td>Nuclear Cardiology Reading Room, Main Bldg, 2nd floor</td>
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<tr>
<td>Resident Study/Resource Area</td>
<td>Cardiology fellows room, 7th Floor APC</td>
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II. FACULTY

Drs. Raymond Russell, James Arrighi, Richard Noto, Don Yoo, Brian. Abbott, Michael Gilson, Daniel Levine, James Robertson, Marilyn Weigner, Philip Haines

Lines of Responsibility (in order):
In all clinical in-patient rotations, cardiology fellows will interact with generalists and specialists in all areas, functioning as consultants for cardiovascular problems. This rotation is laboratory-based, and as such the fellow’s primary responsibility is related to the performance and interpretation of diagnostic cardiac imaging studies. Particularly close interactions are fostered with referring physicians (all specialties), house staff, stress lab nurse clinicians, and imaging technologists. The team is led by the attending, who bears final responsibility for patient management and image interpretation. The cardiology fellow is next in line, followed by medical residents if present on the rotation.

III. GENERAL GOALS AND EDUCATIONAL OBJECTIVES FOR THIS ROTATION

**General Goals:** Nuclear cardiology training requires an understanding of cardiovascular pathology, physiology, and anatomy. These methods provide important diagnostic and prognostic information. As a first or second year fellow, the 2 months required in this area is designed to provide the general (level I) training necessary for a clinical cardiologist to understand the role of nuclear cardiology and cardiac CT in general clinical practice. This rotation, with others, also will serve to allow the fellow to achieve competence in stress testing procedures. As an elective (additional months in the 2nd or 3rd year), the primary goal of this rotation is to achieve level 2 or 3 competency in nuclear cardiology.

**First Rotation:**

**Medical Knowledge:**
1. Know indications for myocardial perfusion imaging and the appropriate selection of exercise versus pharmacologic stress.
2. Know how to evaluate pre-test and post-test probability
3. Know the indications, risks, and contraindications for stress testing (both for diagnosis and risk stratification).
4. Know common exercise test protocols.
5. Know ECG and hemodynamic for stopping a test and defining high risk.
6. Know the limitations of exercise ECG alone, and the potential utility of adding imaging.

**Patient Care:**
1. Identify results that indicate a high risk state.
2. Skill to select appropriate stress type and exercise protocol for diverse patient types.
Systems-Based Practice:
1. Incorporate appropriate use criteria, risk-benefit, and cost considerations in the use of stress testing and cardiac radionuclide procedures.
2. Work effectively with nuclear cardiology laboratory staff.

**Second Rotation:**

Medical Knowledge:
1. Know principles of image acquisition and display, including standard tomographic views.
2. Know properties of perfusion tracers.
3. Know principles of radiation safety.

Patient Care:
1. Integrate nuclear imaging findings with other clinical data for evaluation and management of patients.
2. Skill to safely perform stress testing (both exercise and pharmacologic).
3. Skill to identify and treat complications from stress testing.
4. Integrate all data from stress testing for risk assessment.

Systems-Based Practice:
1. Effectively lead and coordinate the stress test interdisciplinary team.

Practice-Based Learning and Improvement:
1. Identify gaps in knowledge to focus learning.

Interpersonal and Communication Skills:
1. Communicate effectively with patients and referring physicians regarding the results of testing.

**Advanced (Elective) Rotations:**

Medical Knowledge:
1. Know protocols of administration for all radiotracers used for nuclear cardiology procedures.
2. Know techniques to minimize radiation exposure.
3. Know how to perform quality control on images, including recognition of artifacts.
4. Know the potential role of PET cardiac imaging, including types of studies and radiotracers.

Patient Care:
1. Perform and interpret gated rest/stress myocardial perfusion imaging studies.
2. Perform and interpret radionuclide ventriculography.

Systems-Based Practice:
1. Participate in lab quality monitoring initiatives.

Interpersonal and Communications Skills:
1. Create a comprehensive and understandable report.

**NRC TRAINING:**
For individuals who wish to achieve level 2 or greater training in nuclear cardiology, they must gain an understanding of nuclear imaging technology and radiation safety. Radiation safety training is in part obtained through a formal didactic course, as per NRC guidelines.

**IV. TOPICS/TEACHING METHODS/MATERIALS USED DURING THIS ROTATION**
Specific topics to be covered during this rotation:
Nuclear cardiology

Principal teaching methods (see section IX):
Clinical teaching (A)
Clinical experiences (B)
Performance feedback
   Monthly evaluations (C1)
   Semiannual evaluations (C2)
Conferences (nuclear conference) (D)

Recommended educational materials:
Introductory texts (required reading):
   Chaitman BR. Exercise stress testing. In: Braunwald’s Heart Disease, Current Edition
   Udelson JE et al. Nuclear cardiology. In: Braunwald’s Heart Disease, Current Edition
Supplemental introductory text:
   Heller GV. Nuclear cardiology: Practical applications, Current Edition
Advanced text:
   American Society of Nuclear Cardiology (www.asnc.org), Imaging Guidelines for Nuclear Cardiology Procedures.
   American Society of Nuclear Cardiology, Appropriate Use Criteria for Cardiac Radionuclide Imaging.
   American Society of Nuclear Cardiology, Patient Centered Imaging.
   ACC/ASNC. Developing an action plan for patient radiation safety in adult cardiovascular medicine.

V. EVALUATIONS
A. Evaluation of the fellow’s successful completion of the above goals will be carried out by the attending physicians. Assessment methods include:
   Clinical performance ratings: Rotation evaluations (1A), semiannual evaluations (1B)
   Focused observation and evaluation (2)
   Faculty/staff meetings (4)
   Procedure logs (5)
B. Residents will evaluate the rotation annually.

VI. RESPONSIBILITY OF ATTENDING ON ROTATION
1. Read and report all clinical studies on the day performed.
2. Teach fellow in the principles and practice of nuclear cardiology.
3. Recommend appropriate reading material for fellows.
4. Clearly communicate availability and reading schedule to fellow on a daily basis.

VII. RESPONSIBILITY OF FELLOW ON ROTATION
1. Observe isotope preparation, dose (or dye) administration, image acquisition, and image processing for 5 studies. (Coordinate with lead cardiac technologist, Ron Bailey) For level 2 or 3 training, the minimum number of procedures should be performed according to current ACC COCATS guidelines.
2. Perform stress testing according to schedule determined at beginning of month, coordinated with
nursing staff (Cheryl Gleason, RN, supervisor). *First and second year fellows must be present for an average of 5 stress tests per day.* Default schedule is: fellow has primary responsibility for stress testing in one room on Tuesdays and Thursdays.

3. When needed, screen studies for appropriateness, communicate with referring physicians, and answer questions from clinicians about any aspect of the study.
4. Prepare daily studies for reading, according the attending schedule.
5. Review all studies, before attending review if possible, and formulate an initial summary of findings and conclusions.
6. Obtain correlation with other imaging studies.
7. Record interesting cases in case log book.
8. For any cases presented at cardiology conference with nuclear correlation, the fellow is responsible for presenting these cases and coordinating with the primary presenter.
9. Prepare one nuclear conference on a topic in nuclear cardiology (after discussion with attending).
10. Record number of studies read at end of each rotation and record in procedure log.
11. For senior fellows (after first 2 months in lab), the fellow will manage all aspects of the laboratory under the direction of the attending of the day.
12. For Level 2 training in nuclear cardiology completion of the Radiation Safety, Physics, Instrumentation, and Radiochemistry Course is required (the “80-hour” course), as specified by Nuclear Regulatory Commission regulations pertaining to Authorized User Status for Imaging and Localization Studies.

### VIII. CONFERENCE AND CLINIC SCHEDULE SPECIFIC TO THIS ROTATION

<table>
<thead>
<tr>
<th>AM</th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
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<tbody>
<tr>
<td>PM</td>
<td></td>
<td></td>
<td></td>
<td>Imaging</td>
<td>Conference (Echo or Nuclear)</td>
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