**VA Nuclear/Stress/Rehab rotation curriculum**

### Description of Rotation or Educational Experience

The Nuclear/Stress/Rehab rotation provides trainees the opportunity to develop skills in performing pharmacologic and exercise stress tests, as well as monitoring said tests and interpreting the data. It also serves as a rotation to learn more about cardiac rehabilitation and what exactly it entails. Fellows will be on this rotation multiple times during their career at VA, and with repeated exposure to the rotation, it is expected that fellows will gain more confidence in their skills in ordering, administering, and interpreting stress tests of various types as well as become more confident in prescribing a cardiac rehabilitation plan for their patients.

### Patient Care

#### Goal

Fellows must be able to provide patient care that is compassionate, appropriate, and effective for the treatment of health problems and the promotion of health. Residents are expected to:

#### Competencies

- The fellow will be responsible for understanding the principles of stress testing, both exercise and pharmacological, including nuclear stress testing.
- The fellow will understand the basic hemodynamic principles involved in exercise, pharmacological, and nuclear stress testing.
- The fellow will be proficient in the performance of both exercise and pharmacological, and nuclear stress testing, and in the evaluation of the findings of the testing.
- The fellow will be capable of formulating a management plan on the basis of the stress test results.
- The fellow will be capable of organizing and supervising an exercise program for patients with heart disease.

#### Objectives

- The fellow should spend at least 8 hours in cardiac rehabilitation during this rotation. The intent is to familiarize the fellow with the basic concepts of rehabilitation as it pertains to their patients.
- Supervise at least 50 exercise stress tests. During this month the fellow will be involved in the performance and interpretation of both exercise and pharmacological stress tests.
- The fellows will share the responsibility of directing and monitoring exercise and nuclear stress testing studies on each day of the rotation.
- The fellow will be responsible for reviewing the chart, examining the patient prior to the stress test, and personally monitoring all high-risk patients during the stress testing.
- The fellow will review the findings of each specific test on a daily basis and
determine the significance of the findings and the hemodynamics. A final decision will then be made concerning whether or not the findings are abnormal.

- The fellow’s evaluation of each stress test will be reviewed and discussed with the faculty member assigned to read stress tests on that particular day.

### Medical Knowledge

#### Goal
Fellows must demonstrate knowledge of established and evolving biomedical, clinical, epidemiological, and social-behavioral sciences, as well as the application of this knowledge to patient care. Fellows are expected to:

#### Competencies

- Understand basic physical properties of myocardial perfusion tracers including the strengths and weaknesses of thallium-201, Tc-99m sestamibi, and tetrafosmin.
- Gain an understanding of the physiological basis of dipyridamole, lexiscan, and dobutamine use in pharmacologic stress testing.
- Gain an understanding of the role of perfusion tracers for the noninvasive assessment of coronary flow reserve in the detection of epicardial coronary artery disease, pre-operative risk stratification and myocardial viability. Understand the usual sensitivities, specificities, positive and negative predictive values of thallium-201, Tc-99m sestamibi, and tetrafosmin perfusion scanning for these purposes.
- The fellow will understand fully what is regarded as a “high risk” perfusion scan as it pertains to potential severe coronary artery disease during both pharmacologic and exercise stress perfusion scanning.
- The fellow will understand which patient variables constitute a contraindication for the administration of dipyridamole and lexiscan
- The fellow will become familiar with principles of cardiac rehabilitation therapy.

#### Objectives

- The fellow will gain the ability to accurately interpret perfusion scans and infer which vascular territories likely harbor obstructive disease. This will be measured through direct discussion with the fellow and attending when reviewing stress tests.
- The fellow will gain a basic understanding of the role computer processing plays in the reconstruction of the perfusion images and where error may be introduced.
- The fellow will, where able, correlate perfusion scan results with coronary anatomy documented at the time of catheterization as well as with regional wall motion abnormalities on ventriculography.
- The fellow will acquire knowledge of the principles of exercise physiology and its relation to cardiac diseases, including the benefits of exercise through observation of cardiac rehabilitation.

### Practice- Based Learning and Improvement
**Goal**
Fellows must demonstrate the ability to investigate and evaluate their care of patients, to appraise and assimilate scientific evidence, and to continuously improve patient care based on constant self-evaluation and life long learning. Fellows are expected to develop skills and habits to be able to:

**Competencies**
The list below reflects competencies that fall under Practice–based Learning and Improvement.

- Identify strengths, deficiencies and limits in one’s knowledge and expertise;
- Set learning and improvement goals
- Identify and perform appropriate learning activities
- Systematically analyze practice, using quality improvement methods, and implement changes with the goal of practice improvement
- Incorporate formative evaluation feedback into daily practice
- Locate, appraise and assimilate evidence from scientific studies related to their patients’ health problems
- Use information technology to optimize learning
- Participate in the education of patients, families, students, residents and other health professionals, as documented by evaluations of a resident’s teaching abilities by faculty and/or learners

**Objectives**

- Learn the resources available to obtain information necessary for optimal patient care under the direction of faculty. Set learning and improvement goals at the beginning of the month.
- Independently use available resources to quickly and efficiently obtain critical information vital to optimal patient care in the setting of the nuclear lab.

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**Systems Based Practice**

**Goal**
Fellows must demonstrate an awareness of and responsiveness to the larger context and system of health care, as well as the ability to call effectively on other resources in the system to provide optimal health care. Fellows are expected to:

**Competencies**
The list below reflects competencies that fall under Systems Based Practice.

- Work effectively in various health care delivery settings and systems relevant to their clinical specialty
- Coordinate patient care within the health care system relevant to their clinical specialty
- Incorporate considerations of cost awareness and risk-benefit analysis in patient care
- Advocate for quality patient care and optimal patient care systems
- Work in interprofessional teams to enhance patient safety and improve patient care quality
- Participate in identifying systems errors and in implementing potential systems
### Objectives
- Fellows will be expected to assist in coordinating care with in-hospital services in the nuclear lab and ancillary services.
- Assist in communication between the referring physicians
- As fellows attain seniority, should also understand and participate in the continuous quality improvement process as it pertains to the nuclear lab. Such as correlating results of studies with the catheterization results to improve accuracy of reads.

### Professionalism

#### Goal
Residents must demonstrate a commitment to carrying out professional responsibilities and an adherence to ethical principles. Residents are expected to demonstrate:

#### Competencies
The list below reflects competencies that fall under Professionalism.
- Compassion, integrity, and respect for others
- Responsiveness to patient needs that supersedes self-interest
- Respect for patient privacy and autonomy
- Accountability to patients, society, and the profession
- Sensitivity and responsiveness to a diverse patient population, including but not limited to diversity in gender, age, culture, race, religion, disabilities, and sexual orientation

#### Objectives
- Demonstrate sound judgment in clinical decision-making.
- Fellows will demonstrate high ethical standards when managing patients.
- Practice sound evidence based medicine.
- Treat patients and peers with the utmost respect.
- Fellows will be readily available to the nuclear lab staff.

### Interpersonal and Communication Skills

#### Goal
Residents must demonstrate interpersonal and communication skills that result in the effective exchange of information and teaming with patients, their families, and professional associates. Residents are expected to:

#### Competencies
The list below reflects competencies that fall under Interpersonal and Communication Skills.
- Communicate effectively with patients and families across a broad range of socioeconomic and cultural backgrounds
- Communicate effectively with physicians, other health professionals, and health related agencies
- Work effectively as a member of leader of a health care team or other professional group
- Act in a consultative role to other physicians and health professionals
- Maintain comprehensive, timely, and legible medical records

**Objectives**
- Fellows will communicate effectively with faculty and nuclear staff.
- Fellows will communicate effectively with patients and families.
- Fellows will develop teaching skills through contact with residents and students, and preparation of formal presentations.

**Teaching Methods**
Fellows will work with the nuclear attending in learning the proper way to administer and monitor stress tests through direct observation and supervision. They will also review reading and interpretation of nuclear images daily with the staff, and should come up with their own preliminary read. Fellows will also review stress EKGs and give a preliminary read on these tests, and review with the Cardiology staff assigned to read stress tests that day. Fellows will also have access to the reading material as delineated below which they can use as a reference, and will also be expected to read the guidelines for administration of stress testing.

**Assessment Method (residents)**
Fellows are given verbal feedback on their performance by the faculty throughout the rotation. Final evaluations by each attending will be based on the general ACGME competencies of patient care, medical knowledge, practice-based learning and improvement, interpersonal and communication skills, systems-based practice, and professionalism. A formal written evaluation will be entered by the faculty. It will then be reviewed and signed by the fellow.

Fellows are also evaluated through use of the 360 evaluation system, where feedback from nursing, social work, case management, patients, Nuclear lab staff and others can be used to assess and refine performance. Specifically communication, systems-based practice, and professionalism can be further assessed.
### Assessment Method (Program Evaluation)
Fellows will assess the rotation overall as well as their attending physicians. These will be written evaluations which will be shared with the Chair of the Division as well as the Fellowship Program Director. Feedback from the fellows will allow for correction of any perceived deficiencies in learning opportunities on this rotation.

### Level of Supervision
Fellows will on a daily basis interact with 1 Nuclear Medicine attending and 1 Cardiology attending in regards to stress testing. These attendings change daily, but are always available to the fellow. These attendings will supervise the cardiology fellow assigned to the service in the performance of inpatient and outpatient stress test administration, supervision, and interpretation.

### Educational Resources
The fellow will be expected to practice sound evidence based medicine and will be given access to resources to be utilized to enhance this practice. Resources include citations of important literature and use of hospital and MCW-based information technology.

### Suggested Reading

- Nuclear Cardiology: Practical Applications by Gary and Heller
- Nuclear Imaging: Principals and Applications by Iskandrian and Verani
- Physical and Technical Aspects of Nuclear Cardiology by Garcia and Botvinick
- Stress Testing: Principles and Practice by Ellestad
- Braunwald’s Textbook of Cardiovascular Medicine
- Hurst’s The Heart
- ACC-SAP