



## Accreditation

# ICANL & ACR ACCREDITATION IN NUCLEAR MEDICINE

## *ICANL & ACR ACCREDITATION IN NUCLEAR MEDICINE*

**What is Accreditation?**

**What is the Path to Accreditation?**

**ICANL or ACR**

**What is the Cost?**

**Why Accreditation?**

**Ties to Future Reimbursement**

ACCREDITATION & REVIEW PROCESS	
PERSONNEL REQUIREMENTS	
ICANL	ACR
PROTOCOLS	
ICANL	ACR
QUALITY CONTROL	
ICANL	ACR
REPORTS	
ICANL	ACR
OUTCOME & QUALITY ASSESSMENT	
ICANL	ACR
CLINICAL: CASE SELECTION	
ICANL	ACR
SITE VISITS	
ICANL	ACR
COMMON DEFICIENCIES	
ICANL	ACR

# ***ICANL & ACR ACCREDITATION IN NUCLEAR MEDICINE***

## **What is Accreditation?**

Demonstrates quality patient care at a level consistent with practice standards through peer review

- \* Ensures diagnostic studies that are performed timely and of high quality
- \* Documents personnel qualifications and maintenance through continuing education
- \* Documents imaging procedures
- \* Documents equipment and quality control procedures

## **Path to Accreditation**

- \* Select accreditation organization ICANL or ACR
- \* Budget for time and expenses: Takes a minimum of 6 months
- \* Review guidelines and requirements: Modifications for compliance may be necessary.
- \* Application and review process
- \* Accreditation for three years

## **Application:**

- \* Document personnel and qualifications
- \* Document facilities, equipment, policies and procedures
- \* Submit patient and phantom images for review

## **Review of completed application**

- \* Site visit
- \* Correct deficiencies

## ***ICANL & ACR ACCREDITATION IN NUCLEAR MEDICINE***

**What is the Cost?** - Approximately \$1800-\$4000 plus consultant fees and any necessary phantoms will add \$1000's.

### **Documentation: ICANL PROTOCOLS**

- \* Keeping procedures and policies current (personnel time)
- \* Record keeping (personnel time)

### **Commitment to high quality**

- \* Maintain facilities & equipment
- \* Loss in productivity

### **Why Accreditation?**

- \* Are you concerned about study quality?
- \* Do you want to be the best that you can be?
- \* Do you want to be recognized?

### **Marketing Tool! Are you concerned about future reimbursements?**

## ***ICANL & ACR ACCREDITATION IN NUCLEAR MEDICINE***

### **Payment Policy for Nuclear Cardiology:**

- \* United Healthcare of Wisconsin: Outpatient nuclear cardiology facilities to be accredited by 7/1/2003
- \* Oxford Health Plans: Nuclear cardiology laboratories to be accredited and all physicians to be CBNC, ABR or ABN by February 4, 2004
- \* Blue Cross/Blue Shield of Alabama: ICANL or ACR accreditation for PET reimbursement
- \* Care Core National Outpatient diagnostic imaging for HIP, Aetna and GHI in NY: All nuclear cardiology laboratories to be accredited by Feb., 2004 & More ....
- \* \* All Nuclear Medicine Departments have been put on notice by United Healthcare that they need to be accredited by March, 2008 in order to ensure payment.
- \* Medicare Issues - The Patients and Providers Act on July, 2008. By 2012, providers of advanced diagnostic imaging services, need to obtain accreditation as a condition for reimbursement.
- \* Anthem Health Plans of Virginia, Inc, Anthem Blue Cross and Blue Shield and its HMO affiliate issued an announcement that providers that perform advanced diagnostic imaging need to be accredited.
- \* The Society of Nuclear Medicine-Technologist Section, The American Society of Nuclear Cardiology (ASNC) and the American College of Cardiology (ACC) has passed resolutions endorsing mandatory accreditation by 2008.
- \* Pay For Performance Accreditation of facility is one of the measures of performance

## ***ACR ACCREDITATION IN NUCLEAR MEDICINE***

### **ACCREDITATION MODULES:**

Accreditation in nuclear medicine is facility based; all units used by a facility must pass the evaluation in order for a facility to be granted accreditation.

MODULE 1: GENERAL NUCLEAR MEDICINE (Planar Imaging)

MODULE 2: SPECT (Single Photon Emission Computed Tomography)

MODULE 3: NUCLEAR CARDIOLOGY IMAGING

MODULE 4: PET/COINCIDENCE IMAGING

### **PET ACCREDITATION:**

PET/COINCIDENCE Imaging facilities should apply once all personnel qualifications, equipment specifications and quality control/quality assurance activities are established.

Sites applying for PET accreditation must apply for all sub modules performed:

ONCOLOGY-CARDIAC-BRAIN

### **MULTIPLE SITES:**

Accreditation in nuclear medicine is facility based; all units used by a facility must pass the evaluation in order for a facility to be granted accreditation

ACR Accreditation is site specific.

Each site is accredited separately.

### **QA, PEER REVIEW AND REPORTS**

Accreditation in nuclear medicine is facility based; all units used by a facility must pass the evaluation in order for a facility to be granted accreditation

ACR Accreditation is site specific.

Each site is accredited separately.

### **ACR FEE STRUCTURE**

\*This updated information is taken directly from the [www.acr.org](http://www.acr.org) website, December, 2007- Please go there directly to check for any change- fees are subject to change

## ***ACR ACCREDITATION IN NUCLEAR MEDICINE***

### **CYCLE AND FEES:**

-ACCREDITATION:Initial Cycle and Renewal  
\$1200 facility fee

Plus per unit (module 1,2, or 3)

One Module \$600

Two Module \$1200

Three Modules \$1800

-REPEAT:

\$600 per module, if repeating clinical exams

\$600 if repeating phantoms

-REINSTATE CORRECTIVE ACTION:

\$1200 facility fee plus \$600 per module

-ADD NEW UNITS/MODULES-MIDCYCLE:

\$600/Per Unit- Modules 1,2, or 3:

One Module \$600

Two Module \$1200

Three Modules \$1800

-REPLACEMENT CERTIFICATE:

\$65.00 Per Certificate

-NUCLEAR MEDICINE/PET ACCREDITATION: Program Requirements

Personnel Qualifications

Acceptance Tests, Performance Tests, and Quality Control

Clinical Images Exam Identification and Labeling

Clinical Protocols

-WHAT ACR HAS ACHIEVED (December, 2007)

Nuclear Medicine Receipt of 422 applications under review-729 ACR accredited sites

PET Receipt of 192 applications under review-408 ACR accredited sites

## ***ACR IN NUCLEAR MEDICINE- REQUIREMENTS***

### **-THE APPLICATION:**

Online Application at Website: <http://www.acr.org>

### **-QUALIFICATIONS:**

This information is taken directly from the acr website as of December, 2007. Please go there directly to check for any changes

### **-INTERPRETING NUCLEAR MEDICINE:**

Board Certification in Radiology, Nuclear Radiology, or Nuclear Medicine by ABR

American Board of Nuclear Medicine

Royal College of Physicians and Surgeons of Canada or

Le College des Medecins du Quebec

OR: If trained prior to 1965, average 50 scintigrams per month for last 10 years

### **-PET PHYSICIAN: Same as Nuclear Physician:**

WITH THE ADDITION OF 20 Hours CME in PET

In the past 3 years the following numbers must be met: IF INTERPRETING: Cardiac PET exams, at least 20 studies must be interpreted or multi-read

Brain PET exams, at least 30 studies must be interpreted or multi-read

Oncologic PET exams, at least 80 studies must be interpreted or multi-read

If Interpreting brain and oncologic PET exams, Interpretation must include direct image correlation with CT or MRI. Teaching cases are acceptable with documented interpretation.

### **-NON-NUCLEAR MEDICINE PHYSICIAN/RADIOLOGIST INTERPRETING CARDIOVASCULAR NUCLEAR MEDICINE ONLY:**

Board Certification in Cardiology by:

American Board of Internal Medicine

American Osteopathic Board of Internal Medicine

Royal College of Physicians and Surgeons of Canada or...

Le College des Medecins du Quebec

AND- Completion of the Level 2 Core Cardiology Training Symposium (COCATS) training program in Nuclear Cardiology (See Attachment 1 at acr.org website)

OR-Cardiologists who trained prior to July, 1995 must be board certified in cardiology and have the equivalent of Level 2 training.

## ***ACR IN NUCLEAR MEDICINE- REQUIREMENTS***

### **-NON-NUCLEAR MEDICINE PHYSICIAN/RADIOLOGIST INTERPRETING CARDIOVASCULAR PET ONLY**

Same as Cardiologists

With the addition of :

20 Hours of CME in PET in the last 3 years, at least 20 Cardiac PET exams must be interpreted or multi-read

#### **-OR:**

At a minimum, completion of a formal Accreditation Council of Graduate Medical Education (ACGME) approved general nuclear medicine program which must include 200 hours in radiation physics and 500 hours of preparation in instrumentation, radiochemistry, radiopharmacology, radiation dosimetry, radiation biology, radiation safety and protection and quality control. In addition, 1000 hours of clinical training in general nuclear medicine is required which must cover technical performance, calculation of dosages, evaluation of images, correlation with other diagnostic modalities and interpretation.

Facilities monitoring ALL Cardiac Stress must have ONE individual that has ACLS certification present during the stress testing.

All physicians supervising and interpreting PET Cardiology must have ACLS certification

#### **-TECHNOLOGISTS:**

##### **NUCLEAR MEDICAL TECHNOLOGISTS-**

ARRT (N) or NMTCB registered or equivalent state license for nuclear medicine technology.

OR: Completion of nuclear medicine training program that must include training in the basic and medical sciences as they apply to nuclear medicine technology and practical experience in performing nuclear medicine procedures.

Continuing Education: 15 hours of continuing education in nuclear medicine in the last 3 years (recommended)

##### **PET TECHNOLOGIST-**

ARRT (N) or NMTCB registered or equivalent state license

OR: Completion of nuclear medicine training program

Continuing Education: 15 hours continuing education in PET in the last 3 years (recommended)



## ***ICANL IN NUCLEAR MEDICINE- REQUIREMENTS***

**-COMPREHENSIVE WEBSITE INCLUDES:** <http://www.icanl.org>

Standards for Nuclear Medicine & Nuclear Cardiology

Reimbursement updates

List of accredited laboratories

How to apply

Standards for Nuclear Medicine & Nuclear Cardiology

Workshop, CME

**-ICANL ACCREDITATION:**

Nuclear Cardiology

Nuclear Medicine

PET

Comprehensive Nuclear Medicine (Includes Nuclear Cardiology and/or PET)

Lab must have been in existence for 6 months, or have performed 600 general nuclear medicine or 300 nuclear cardiology exams.

**MULTIPLE SITES:** Multiple site refers to laboratory sites owned and operated by the same corporation/ entity. -

All sites have the same Medical and Technical Director.

All physicians must be included in the Organization section of the application.

All technologists must be included in the application.

All physicians and technologists from all sites must participate together in quality assurance and education programs, including in-house conferences.

Two additional SPECT cases per site must be submitted for review following same case selection guidelines in Part II of The Standards.

**MOBILE SITES:** A mobile service is comprised of one or more units (technologist and equipment) that provide nuclear medicine, nuclear cardiology, or PET imaging services at one or more locations. -

All examinations performed at the mobile locations must be interpreted by physicians included in the application.

All technologists performing any examinations at mobile locations must be included in the application.

The mobile service must share the same Medical Director and Technical Director.

All physicians and technologists must participate in quality assurance and education programs, and in-house conferences.

The mobile service must utilize identical protocols.

## ***ICANL IN NUCLEAR MEDICINE- REQUIREMENTS***

### **-ICANL FEE STRUCTURE:**

\*This updated information is taken directly from the [www.icanl.org](http://www.icanl.org) website, December,2007-

Please go there directly to check for any change- fees are subject to change

### **-MATERIALS:**

Standards, applications and disk - \$200

### **APPLICATION FEES:**

Nuclear Cardiology (alone) - \$3,300

PET (alone) - \$3,300

Nuclear Medicine (alone) - \$3,300

Comprehensive Nuclear Medicine including PET and/or Nuclear Cardiology - \$3,800

All fees include a mandatory site visit

### **DECISION PATHWAYS:**

Accreditation granted for three years

Accreditation granted provisional one year only pending correction of deficiencies

Staff CME

Protocols missing details

Accreditation delayed

Accreditation denied

### **What ICANL Has Achieved? (\*December,2007):**

Multi- Specialty Laboratories Over 1100 ICANL accredited sites Private offices: 73%

Hospitals: 13%

Freestanding Clinics: 3%

Mobile Services: 3%

Other: 4%

## ***ACR IN NUCLEAR MEDICINE- PROTOCOLS***

### **-SUBMITWRITTEN PROTOCOLS**

Submit a written copy of the written procedure for each type of clinical exam submitted

Answer the Questionnaire regarding written protocols Reporting mechanisms and administrative policies

Nuclear Pharmacy

Imaging protocols expected to follow ACR Practice Standards.

Radiation and laboratory safety

ACR gives complete instructions for the Quality Control which is required utilizing the specific Jaszak SPECT/PET Phantoms- MAKE SURE YOU FOLLOW DIRECTIONS exactly as written.

## ***ICANL IN NUCLEAR MEDICINE- PROTOCOLS***

### **-SUBMITWRITTEN PROTOCOLS**

For every clinical procedure: Imaging

Therapy

Exercise/pharmacologic stress

Equipment QA

Physician reporting

Outcome and quality assessment

Radiation and laboratory safety

Administrative and personnel policies

General Protocol Guidelines

A complete procedure manual and include corresponding references.

Protocols be reviewed and updated as needed by the Medical Director or designee every 3 years. Revisions and updates dated and signed.

The Radiation Protection Program must be reviewed annually. Records of the review should include program changes, noted deficiencies and actions taken.

Where appropriate, records must be maintained to document compliance with protocols. (e.g. radiopharmaceutical receipt/disposal records, spill records etc.)

Accepted Published Guidelines - see the ICANL website for any updated guidelines

1.2.2.1- For general nuclear medicine clinical procedures- Nuclear Medicine Guidelines, published by the Society of Nuclear Medicine

1.2.2.2- For nuclear cardiology procedures, Updated Imaging Guidelines for Nuclear Cardiology Procedures- Part 1 and 2, Journal of Nuclear Cardiology

1.2.2.3- For cardiac exercise stress testing, American College of Cardiology/American Heart Association guidelines for Exercise Testing, Journal of the American College of Cardiology 1997;30:260-315

1.2.2.4- For NRC or similar regulations regarding medical use of byproduct materials, Guide for Diagnostic Nuclear Medicine and Guide for Therapeutic Nuclear Medicine, Society of Nuclear Medicine

## ***ICANL IN NUCLEAR MEDICINE- PROTOCOLS***

### **-THE STANDARDS:**

The Standards (previously known as the Essentials and Standards) for nuclear laboratories are divided into two parts

Nuclear Medicine (includes PET)

Nuclear Cardiology

### **-Nuclear Medicine Part I - Structure and Organization**

Nuclear Medicine Facility Definition : “A nuclear medicine facility consists of at least one nuclear imaging camera, a qualified physician and a nuclear medicine technologist. Each facility must have a Medical Director and Technical Director. It may be a single site, a conglomerate of sites, a mobile facility or a combination of the above, meeting the organizational structures defined in this document. There may be additional physicians, nuclear medicine technologists, and other professional and/or technical personnel. When more than one technical member is employed, a Technical Director (e.g. chief technologist) is responsible for supervision of the technical staff.”

“The facility must be in compliance with the Nuclear Regulatory Commission (NRC) regulations or, in Agreement States, with State regulations for medical diagnostic and therapeutic (if applicable) use of radioisotopes.” Section 1 – Personnel and Supervision

Section 2 – Ancillary Personnel

Section 3 – Physical Facilities

Section 4 – Equipment and Instrumentation

Section 5 – Volume of Clinical Procedures

## ***ICANL IN NUCLEAR MEDICINE- PROTOCOLS***

### **-PERSONNEL REQUIREMENTS: MEDICAL DIRECTOR**

Responsible for all nuclear medicine services including quality control, radiation safety, and the quality and appropriateness of care provided.

Licensed physician and authorized user by NRC or State

#### 1.1.3 Continuing Education Requirements:

A. The Medical Director must obtain at least 15 hours of AMA Category I continuing medical education (CME) credits, relevant to nuclear medicine, every three years. This requirement is mandatory effective January 1, 2004.

B. Documentation of CME credits must be kept on file and available for inspection.

Training and Experience- Must meet a least one of the following criteria

Board Certified (or Board eligible but within 2 years of finishing training) in nuclear medicine

Board Certified (or Board eligible but within 2 years of finishing training) in radiology with special competence in nuclear medicine

Board Certified (or Board eligible but within 2 years of finishing training) in radiology with at least 4 months of nuclear medicine training with interpretation of at least 800 nuclear procedures.

Board Certified (or Board eligible but within 2 years of finishing training) in any other medical specialty recognized by the American Board of Medical Specialties or American Osteopathic Association and at least one year of nuclear medicine practice experience with independent interpretation of at least 1000 general nuclear medicine procedures and/or, if performing nuclear medicine therapies, independent performance of at least 20 nuclear medicine therapies.

Ten years of nuclear medicine practice experience with independent interpretation of at least 1000 general nuclear medicine procedures and/or, if performing nuclear medicine therapies, independent performance of at least 20 nuclear medicine therapies.

### **-PERSONNEL REQUIREMENTS: TECHNICAL DIRECTOR:**

Nuclear Medicine technologist with RT(N), CNMT, and/or state license

Minimum of 3 years clinical experience

Current basic life support (BLS) certification

Responsibilities - day-to-day operations, delegates responsibilities to other technologists and staff.

Obtain 15 hours of CE every 3 years, and should include at least 3 hrs. in imaging, quality control/ instrumentation, and radiopharmaceuticals. CE hours approved (VOICE, ARRT-Category A, ASRT, AMA Category I). Documentation of CE on file!

## ***ICANL IN NUCLEAR MEDICINE- PROTOCOLS***

### **-PERSONNEL REQUIREMENTS: OTHER PERSONNEL:**

Nuclear Medicine technologists – same training and CE requirements as Technical Director, except no experience requirement.

Interpreting physicians – same training, experience, and CME as Medical Director.

Direct Patient Care personnel - have BLS training. There should be ACLS (Advanced Cardiac Life Support) certified personnel on site during cardiac stress procedures.

Ancillary personnel – necessary for effective patient care and include Clerical, and administrative assistants, Physicist or consulting physicist, radiopharmacist, computer support, and other staff.

### **-EQUIPMENT AND INSTRUMENTATION IN NUCLEAR MEDICINE**

Equipment and instrumentation used in the nuclear medicine facility must be in good working condition, routinely inspected for safety, properly functioning and records kept on file. It should include the following:

- Dose calibrator or decay correction calculation system, as appropriate for the site.
- Imaging/ counting equipment
- Radiation monitoring devices including:
  - Portable survey meter (required)
  - Removable contamination counting equipment (as applicable)
  - Fixed area survey meter for dose
- Preparation/storage areas (as applicable)
- Resuscitation equipment and supplies (appropriate to the types of procedures being performed)
- Exercise equipment (as applicable)
- ECG equipment (as applicable)
- Ancillary monitoring equipment (as applicable)
- Infusion pumps/automated injectors (as applicable)
- Glucometers (as applicable)

## ***ACR IN NUCLEAR MEDICINE- CLINICAL SELECTIONS***

The following are the specific areas of Nuclear Medicine for which accreditation may be obtained:

- gastrointestinal system imaging
- central nervous system imaging
- endocrine system imaging
- endocrine system non-imaging (e.g. radioiodine uptake)
- skeletal system imaging
- genitourinary system imaging
- pulmonary system imaging
- infection imaging
- tumor imaging
- hematopoietic, reticulendothelial and lymphatic imaging
- nuclear cardiology imaging
  - myocardial perfusion imaging
  - equilibrium radionuclide angiography
  - other cardiovascular imaging
- nuclear medicine therapy

The following are the specific areas of PET for which accreditation may be obtained:

oncologic imaging - neurologic imaging - cardiac imaging



## ***ACR IN NUCLEAR MEDICINE- CLINICAL SELECTIONS***

### **-COMPREHENSIVE NUCLEAR MEDICINE CASE SELECTION**

Two cases per body system area not to exceed 24. All cases submitted electronically on a computer disk.  
(List on previous page)

For nuclear cardiology - 3 RMPI and 3 ERNA

For PET - 3 PET cases Case selection not camera dependent

Not more than one case per exam type should be normal

Performed by current personnel on current equipment

Selected cases should represent as many staff members as possible

### **-PET CASE STUDY SELECTION**

Oncologic Imaging

Neurologic Imaging

Cardiac Imaging

Requirements: Submit 10 case studies total that represent a mix of disease categories by body system on a computer disk

Not more than one case per exam type should be normal.

Submit examples of BEST WORK only (not random)

### **-NUCLEAR CARDIOLOGY CASE STUDY SELECTION**

2 months preceding the submission of application; select RMPI as follows:

Case 1: 1st Monday of month – 1st case

Case 2: 1st Wednesday of month – 2nd case

Case 3: 2nd Monday of month – 3rd case

Case 4: 2nd Wednesday of month – 1st case

Case 5: 3rd Wednesday of month – 2nd case If no case performed on specified day – use next consecutive day

Case selection not camera dependent

No more than one case can be normal (if requested case is normal, go to next case until one can be found)

Provide a copy of logbook to support appropriate selection

## ***ICANL IN NUCLEAR MEDICINE- CLINICAL SELECTIONS***

### **-COMPREHENSIVE NUCLEAR MEDICINE CASE SELECTION**

Two cases per body system area not to exceed 24. All cases submitted electronically on a computer disk.  
(List on right side of page)

For nuclear cardiology - 3 RMPI and 3 ERNA

For PET - 3 PET cases

Case selection not camera dependent

Not more than one case per exam type should be normal

Performed by current personnel on current equipment

Selected cases should represent as many staff members as possible

### **-PET CASE STUDY SELECTION**

Oncologic Imaging

Neurologic Imaging

Cardiac Imaging

Requirements:

Submit 10 case studies total that represent a mix of disease categories by body system on a computer disk

Not more than one case per exam type should be normal.

Submit examples of BEST WORK only (not random)

### **-NUCLEAR CARDIOLOGY CASE STUDY SELECTION**

2 months preceding the submission of application; select RMPI as follows:

Case 1: 1st Monday of month – 1st case

Case 2: 1st Wednesday of month – 2nd case

Case 3: 2nd Monday of month – 3rd case

Case 4: 2nd Wednesday of month – 1st case

Case 5: 3rd Wednesday of month – 2nd case If no case performed on specified day – use next consecutive day

Case selection not camera dependent

No more than one case can be normal (if requested case is normal, go to next case until one can be found)

Provide a copy of logbook to support appropriate selection

## ***ACR IN NUCLEAR MEDICINE- QUALITY CONTROL***

### **-ANNUAL PERFORMANCE TESTS: GAMMA CAMERAS**

Intrinsic and system (each collimator) uniformity

Intrinsic or system spatial resolution

Energy resolution

System sensitivity (CPM/Bq)

Multiple window spatial registration

Count rate parameters

Overall SPECT performance

Formatter or video display

### **-ANNUAL PERFORMANCE TESTS: NON-IMAGING SYSTEMS**

Dose Calibrators - battery voltage, zero adjustment, background adjustment, constancy test, linearity, accuracy with NIST traceable standard, and geometry

Thyroid Uptake and Counting Systems - high voltage/gain checks, background count rate, Energy resolution, <sup>123</sup>I capsule or long-lived standard calibration check, chi-square test.

### **-ROUTINE QUALITY CONTROL: GAMMA CAMERAS**

Intrinsic or System Uniformity (daily)

Intrinsic or System Spatial Resolution (weekly)

Center-of-Rotation for SPECT Systems (monthly)

Overall System Performance for SPECT Systems with SPECT phantom (quarterly)

High-Count Floods For Uniformity Correction for SPECT Systems (frequency as recommended by a medical physicist)

### **-ROUTINE QUALITY CONTROL: NON IMAGING SYSTEMS**

Dose Calibrators Daily to verify that the calibrator is working correctly

Quarterly linearity test

Leakage - semiannually non-exempt radionuclide sources must be leak tested

Thyroid Uptake and Counting Systems - each day of use to verify energy calibration and sensitivity

## ACR IN NUCLEAR MEDICINE- QUALITY CONTROL

### -ROUTINE QUALITY CONTROL: NON IMAGING SYSTEMS

EQUIPMENT	TEST	FREQUENCY
DOSE CALIBRATOR	CONSTANCY	DAILY
DOSE CALIBRATOR	LINEARITY	QUARTERLY
DOSE CALIBRATOR	ACCURACY	ANNUALLY
SURVEY METER	CALIBRATION	ANNUALLY
GLUCOMETER	ACCURACY	DAILY

### -PET PERFORMANCE TESTING

Daily – validate energy calibration, blank scans, and normalization

Monthly SUV validation

Image quality with PET phantom

Yearly Normalization & uniformity

Spatial resolution

Count rate performance

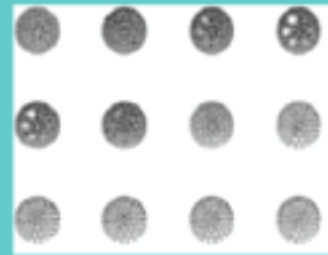
Sensitivity

Attenuation correction accuracy

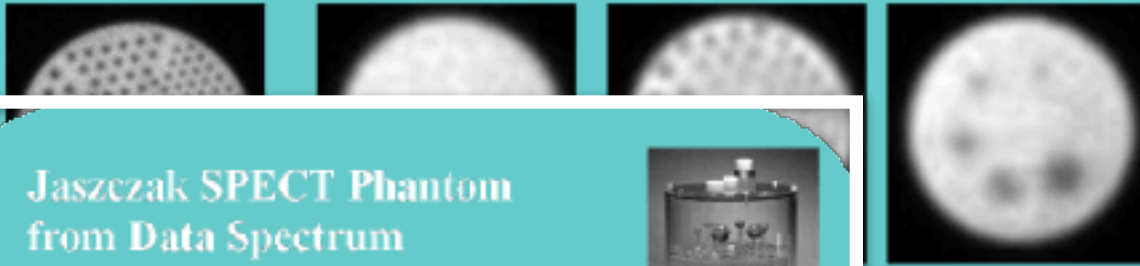
SUV Calibration

Data still being collected to determine required tests in the future.

- Phantom images scored by Nuclear Medicine physicists for planar & SPECT uniformity, resolution, and contrast.



Transaxial  
SPECT Images



- Jaszczak SPECT Phantom from Data Spectrum ([www.spect.com](http://www.spect.com))

– Delux or Standard models

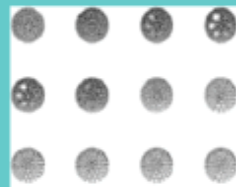


- Flangeless PET Esser Phantom from Data Spectrum

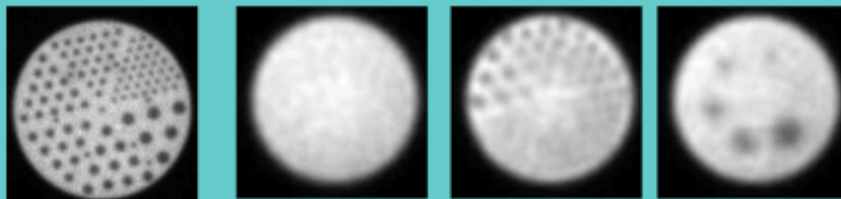


\$2357	ECT phantom and the PET faceplate (can be used for both SPECT and PET acquisitions)
\$1414	ECT phantom (for SPECT only)
\$1886	PET phantom (for PET only)
\$ 945	PET faceplate made to fit an existing flangeless or flanged ECT phantom

- Phantom images scored by Nuclear Medicine physicists for planar & SPECT uniformity, resolution, and contrast.



Transaxial  
SPECT Images



## **ICANL IN NUCLEAR MEDICINE- QUALITY CONTROL**

### **-QUALITY CONTROL:**

Records of service and maintenance must be maintained.

Imaging equipment parameters include: Energy peaking - daily

Intrinsic or extrinsic uniformity - daily

Resolution and linearity - weekly

High count calibration floods - monthly

Center of rotation – monthly

Collimator integrity – annually

Preventive maintenance - 6 months, or per manufacturer's recommendations

### **-PET QUALITY CONTROL:**

Blank scan - daily

Normalization – After hardware change or per manufacturer specification

Absolute activity calibration for SUV – After hardware change or per manufacturer specification.

Preventive maintenance - every 6 months

### **-NON-IMAGING EQUIPMENT QUALITY CONTROL:**

3.3.1- A policy must exist and be followed for routine inspection and testing of all non-imaging equipment such as dose calibrators, uptake probes, survey meters and glucometers and be in accordance with the federal, state and local requirements. The dose calibrator must be calibrated in accordance with nationally recognized standards or the manufacturers instructions.

<b>EQUIPMENT</b>	<b>TEST</b>	<b>FREQUENCY</b>
DOSE CALIBRATOR	CONSTANCY	DAILY
DOSE CALIBRATOR	LINEARITY	QUARTERLY
DOSE CALIBRATOR	ACCURACY	ANNUALLY
SURVEY METER	CALIBRATION	ANNUALLY
GLUCOMETER	ACCURACY	DAILY

## ***ACR IN NUCLEAR MEDICINE-QUALITY ASSURANCE***

### **-NUCLEAR MEDICINE ACCREDITATION PROGRAMS**

"The facility must conduct internal quality assessment at regular time intervals that is appropriate for the facility's stated purpose. The program should have pre-defined indicators of quality and pre-defined thresholds that indicate the need for corrective action. The medical director and appropriate staff must review and maintain minutes or reports of quality assessment evaluations and document, as applicable, corrective measures taken. Inter-facility comparison testing (phantom program) may be included as part of the quality assurance program."

### **-ADMINISTRATIVE QUALITY ASSURANCE**

Appropriateness of procedures

Scheduling back logs

Late reports

Patient wait times

### **-TECHNICAL QUALITY ASSESSMENT**

Image quality

Reproducibility of processed images and/or quantitative results

Image display/labeling

Radiopharmaceutical administration errors

Radioactive spills

Adverse effects

### **-INTERPRETIVE AND THERAPEUTIC QUALITY ASSESSMENT: Program to evaluate ongoing accuracy and quality of reports.**

Areas that may be assessed include: Interobserver agreement (peer review)

Correlation of interpretation with other diagnostic studies, pathology/surgical results and/or patient outcomes

Correlation of intended therapeutic effects with patient response to therapy

### **-SATISFACTION SURVEYS AND MEETINGS:**

Patient Satisfaction

Referring Physician Satisfaction

QA Meetings - All personnel must be included in periodic facility meetings to provide in-service education containing relevant topics. Topics should include safety procedures and improvements to be made based on quality assessments and other information.

## ***ICANL IN NUCLEAR MEDICINE-QUALITY ASSURANCE***

### **-NUCLEAR MEDICINE ACCREDITATION PROGRAMS**

"The facility must conduct internal quality assessment at regular time intervals that is appropriate for the facility's stated purpose. The program should have pre-defined indicators of quality and pre-defined thresholds that indicate the need for corrective action. The medical director and appropriate staff must review and maintain minutes or reports of quality assessment evaluations and document, as applicable, corrective measures taken. Inter-facility comparison testing (phantom program) may be included as part of the quality assurance program."

### **-ADMINISTRATIVE QUALITY ASSURANCE**

Appropriateness of procedures

Scheduling back logs

Late reports

Patient wait times

### **-TECHNICAL QUALITY ASSESSMENT**

Image quality

Reproducibility of processed images and/or quantitative results

Image display/labeling

Radiopharmaceutical administration errors

Radioactive spills

Adverse effects

### **-INTERPRETIVE AND THERAPEUTIC QUALITY ASSESSMENT: Program to evaluate ongoing accuracy and quality of reports.**

Areas that may be assessed include: Interobserver agreement (peer review)

Correlation of interpretation with other diagnostic studies, pathology/surgical results and/or patient outcomes

Correlation of intended therapeutic effects with patient response to therapy

### **-SATISFACTION SURVEYS AND MEETINGS:**

Patient Satisfaction

Referring Physician Satisfaction

QA Meetings - All personnel must be included in periodic facility meetings to provide in-service education containing relevant topics. Topics should include safety procedures and improvements to be made based on quality assessments and other information.



## ***ICANL IN NUCLEAR MEDICINE- QUALITY ASSURANCE***

### **-SITE VISITS**

A pool of individuals are trained by the ICANL to perform site visits. They are a credentialed pool of technologists and/or physicians. Cost of the site visit is included in the application fee. Typically the following will be closely reviewed and/or observed:

### **-SITE VISITS**

Administrative policies and procedures manuals

Clinical procedure protocols

Equipment quality control

Radiation safety

Administrative

Radiation safety documents

Dosage records

Results of prior NRC/State inspections (if any) with any corrective actions

Training/in-service for technologist

Technical procedure manual

Gamma camera and other equipment qc records and any phantom studies available

Quality assurance policies and documentation

Any other pertinent documents related to the operation of the facility

### **-ADMINISTRATIVE POLICIES AND PROCEDURES:**

Are the policies/procedures followed?

Is policy and procedure manual reviewed annually?

Dated and signed or initialed by the director or qualified agent?

### **-ARE THERE POLICIES FOR...**

Infection control?

Patient identification?

Patient assessment (including pregnancy/breast feeding)?

Medical emergencies?

**-SITE VISITS:**

**-MANUALS AND PROTOCOLS FOR...**

Radiation safety

Administrative Policies and Procedures

Diagnostic and therapeutic protocols

Equipment QC

Six to 12 months of records and documentation of routine assessment of basic parameters and calibration of imaging equipment

Last but NOT least - observation of patient imaging, patient dosing, and dose preparation

**-REVIEW OF A RANDOM SAMPLE OF 5-10 CLINICAL STUDIES:**

Turnaround time for final reports:

Signed and completed within two working days?

Does the physician affix the signature (manually or with password protected electronic signature)?

Are prior nuclear medicine studies available for comparison?

Is the quality of the images acceptable?

Is the quality of the report acceptable (contain report components)?

**-RADIATION SAFETY PRACTICES AND RECORDS:**

Area surveys

Wipe tests

Sealed source inventory and leak testing

Are emergency procedures for spills posted in the department?

Is the phone number for the radiation safety officer posted?

Have there been any radioactive spills in the last twelve months?

Are decontamination records maintained?

**-OUTCOME AND QUALITY ASSURANCE:**

A technical quality assessment program is in place including indicators, predefined thresholds for corrective action, and a method for reporting activities?

A program is in place to evaluate the ongoing quality of interpretation

Documentation of QA

## ***ACR IN NUCLEAR MEDICINE- IMAGE INTERPRETATION AND REPORTING***

### **-THE REPORT MUST BE TYPED AND ACCURATELY REFLECT THE CONTENT AND RESULTS OF THE STUDY AND INCLUDE:**

Patient name, age and gender

Requesting health care provider

Date of examination

Date of report

Clinical indication(s)

Interpreted and prepared within one working day. Signed by the interpreting physician within 2 working days.

### **-IMAGE INTERPRETATION AND REPORTING: THE REPORT**

Adequate description of the test performed including type of exam, radiotracer dose and type of stress

An overview of the results of the exam including pertinent positive and negative findings, include localization and quantification of abnormal findings including stress ECG findings

Reasons for limited exams

Summary of test findings

Overall succinct impression

Manual or electronic signature of physician

# ACR IN NUCLEAR MEDICINE- IMAGE INTERPRETATION AND REPORTING

## -EXERCISE NUCLEAR STRESS REPORT

**Type of study:**  
**MYOCARDIAL PERFUSION IMAGING WITH (SESTAMIBI TETROFOSMIN THALLIUM) SPECT AT REST AND AFTER EXERCISE, AND GATED SPECT (AND RESTING FIRST PASS RADIONUCLIDE ANGIOGRAPHY).**

**History:**  
*(e.g. 65-yr woman with known coronary artery disease and recurrent chest pain).*

**Indications:**  
*(e.g. Evaluation for coronary insufficiency; risk stratification; evaluation of ischemia; evaluation of functional capacity; evaluation of myocardial viability).*

**Procedure:**  
The patient exercised on a treadmill (bicycle) for a total of \_\_\_\_\_ minutes, reaching stage \_\_\_\_\_ of the (Bruce; modified Bruce, etc.) protocol, achieving an estimated workload of \_\_\_\_\_ METs. The HR was \_\_\_\_\_ bpm at baseline, and increased to \_\_\_\_\_ bpm at peak exercise, representing 85% (or \_\_\_\_\_ %) of age-predicted maximal heart rate. The blood pressure response was (normal/hypertensive/hypotensive). Resting blood pressure was \_\_\_\_\_ mmHg, and peak/trough blood pressure was \_\_\_\_\_ mmHg. The patient (did/did not) have chest pain/symptoms during the procedure. The electrocardiogram (did not show/showed) ST-segment diagnostic for ischemia (describe appropriate changes).

The patient had myocardial perfusion imaging performed (using a same day/two day, dual isotope imaging protocol), with the injection of \_\_\_\_\_ mCi of (radiopharmaceutical) at peak exercise, and the injection of \_\_\_\_\_ mCi of (radiopharmaceutical) at rest. Imaging was performed by (gated) tomographic technique.

**Findings:**  
The left ventricle was normal in size (enlarged (degree of enlargement)/ LVH was present etc. Describe presence of transient dilation, if present. Describe increased post stress lung uptake, if present. Describe right ventricular abnormality, if present). There were no myocardial perfusion defects (if abnormal describe: e.g.: there was a large antero-apical, antero-lateral perfusion defect on stress images, that was partially reversible on the rest images). Mention whether artifacts were noted or suspected as well. By gated SPECT (or by first pass angiography) resting (post exercise) global LVEF was normal/ abnormal. LVEF was calculated (or visually estimated) at \_\_\_\_%. Regional wall motion/thickening was normal, abnormal (describe). (If appropriate one can describe right ventricular function from the gated SPECT study).

**IMPRESSION:**  
Normal (or mildly abnormal, moderately abnormal, or markedly abnormal) myocardial perfusion (sestamibi tetrofosmin/thallium-201) SPECT imaging after (excellent/adequate/fair/submaximal) exercise, showing a (small/moderate/large) area of [anatomic location] infarction with or without (small/moderate/large) amount of [anatomic location] ischemia. [If considered pertinent add the following info:] The patients had (yes or no) symptoms. The stress ECG was abnormal (describe). The hemodynamic response was abnormal (describe). Resting RV and LV function was (normal/abnormal).

## ***ICANL IN NUCLEAR MEDICINE- IMAGE INTERPRETATION AND REPORTING***

### **-THE REPORT MUST BE TYPED AND ACCURATELY REFLECT THE CONTENT AND RESULTS OF THE STUDY AND INCLUDE:**

Patient name, age and gender

Requesting health care provider

Date of examination

Date of report

Clinical indication(s)

Interpreted and prepared within one working day. Signed by the interpreting physician within 2 working days.

### **-IMAGE INTERPRETATION AND REPORTING: THE REPORT**

Adequate description of the test performed including type of exam, radiotracer dose and type of stress

An overview of the results of the exam including pertinent positive and negative findings, include localization and quantification of abnormal findings including stress ECG findings

Reasons for limited exams

Summary of test findings

Overall succinct impression

Manual or electronic signature of physician

# ICANL IN NUCLEAR MEDICINE- IMAGE INTERPRETATION AND REPORTING

## -EXERCISE NUCLEAR STRESS REPORT

**Type of study:**  
**MYOCARDIAL PERFUSION IMAGING WITH (SESTAMIBI TETROFOSMIN THALLIUM) SPECT AT REST AND AFTER EXERCISE, AND GATED SPECT (AND RESTING FIRST PASS RADIONUCLIDE ANGIOGRAPHY).**

**History:**  
(*e.g. 65-yr woman with known coronary artery disease and recurrent chest pain.*)

**Indication:**  
(*e.g. Evaluation for coronary insufficiency; risk stratification; evaluation of ischemia; evaluation of functional capacity; evaluation of myocardial viability.*)

**Procedures**  
The patient exercised on a treadmill (*bicycle*) for a total of \_\_\_\_\_ minutes, reaching stage \_\_\_\_\_ of the (*Bruce; modified Bruce, etc.*) protocol, achieving an estimated workload of \_\_\_\_\_ METs. The HR was \_\_\_\_\_ bpm at baseline, and increased to \_\_\_\_\_ bpm at peak exercise, representing 85% (or \_\_\_\_\_ %) of age-predicted maximal heart rate. The blood pressure response was (*normal/hypertensive/hypotensive*). Resting blood pressure was \_\_\_\_\_ mmHg, and peak/tradit blood pressure was \_\_\_\_\_ mmHg. The patient (*did/did not*) have chest pain/symptoms during the procedure. The electrocardiogram (*did not show/showed*) ST-segment changes diagnostic for ischemia (*describe appropriate changes*).

The patient had myocardial perfusion imaging performed (*using a same day/ two day, dual isotope imaging protocol*), with the injection of \_\_\_\_\_ mCi of (*radiopharmaceutical*) at peak exercise, and the injection of \_\_\_\_\_ mCi of (*radiopharmaceutical*) at rest. Imaging was performed by (*gated*) tomographic technique.

**Findings:**  
The left ventricle was normal in size (*enlarged (degree of enlargement)/ LVH was present etc.*). Describe presence of transient dilation, if present. Describe increased post stress lung uptake, if present. Describe right ventricular abnormality, if present.  
There were no myocardial perfusion defects (*if abnormal describes: e.g.: there was a large antero-apical, antero-lateral perfusion defect on stress images, that was partially reversible on the rest images*). Mention whether artifacts were noted or suspected as well.  
By gated SPECT (*or by first pass angiography*) resting (*post exercise*) global LVEF was normal/ abnormal. LVEF was calculated (*or visually estimated*) at \_\_\_\_\_ %. Regional wall motion/thickening was normal, abnormal (*describe*). (If appropriate one can describe right ventricular function from the gated SPECT study.)

**IMPRESSION:**  
Normal/ (*or mildly abnormal, moderately abnormal, or markedly abnormal*) myocardial perfusion (*sestamibi tetrofosmin/thallium-201*) SPECT imaging after (*excellent/adequate/fair/submaximal*) exercise, showing a (*small/moderate/large*) area of [*anatomic location*] infarction with or without (*small/moderate/large*) amount of [*anatomic location*] ischemia.  
[*If considered pertinent add the following info:*] The patients had (*yes or no*) symptoms. The stress ECG was abnormal (*describe*). The hemodynamic response was abnormal (*describe*).  
Resting R V and L V function was (*normal/abnormal*).

## ***ICANL/ACR IN NUCLEAR MEDICINE- COMMON DEFICIENCIES***

### **-PROTOCOLS:**

Lacking detail

Missing altogether

Not in compliance with procedure guidelines

Acquisition parameters

### **-CLINICALS:**

ALL films must be properly labeled with patient and technologist information

ALL film must be correctly labeled for laterality and orientation

### **-REPORTS:**

Hot Lab Security

Badging

Injection Technique

### **-IMAGE QUALITY:**

Motion

Artifact

### **-QUALITY CONTROL: ACR-JASCZAK PHANTOM:**

Not following exact specified protocol

Resolution issues

Uniformity