



**Maintenance of Certification
General Outline of Cognitive Exam
(Nuclear Medical Physics) Updated 4/2016**

General Information:

Approximately 30% of the material on the examination is core nuclear medicine physics, technology and safety. The rest is taken from recent advances in the field. Traditional nuclear medicine physics texts and the resources below will be helpful in preparing for the exam.

Length and Structure:

The exam is approximately 150 questions in length. All questions are either multiple-choice questions or r-type questions. A scientific calculator is available but no complex calculations are required.

Clinical Procedures:

Candidates should have a general knowledge of common diagnostic and therapeutic nuclear medicine procedures.

Resources:

Reports and Documents

AAPM Task Group Reports relevant to nuclear medicine

AAPM Task Group 18 Report Assessment of Display Performance for Medical Imaging Systems AAPM Task Group 23: The Measurement, Reporting, and Management of Radiation Dose in CT AAPM Task Group 108: Pet and PET/CT Shielding Requirements

AAPM Task Group 181: The Selection, Use, Calibration, and Quality Assurance of Radionuclide Calibrators Used in Nuclear Medicine

NCRP Report No. 138: Management of Terrorist Events Involving Radioactive Material NCRP Report No. 160:

Ionizing Radiation Exposure of the Population of the United States NCRP Report No. 147: Structural Shielding Design for Medical Imaging Facilities

NCRP Report No. 151: Structural Shielding Design and Evaluation for Megavoltage X-and Gamma-Ray Radiotherapy Facilities

NCRP Report No. 174: Preconception and Prenatal Radiation Exposure: Health Effects and Protective Guidance BEIR VII

NRC Regulations and guidelines relevant to nuclear medicine

ACR Nuclear Medicine Practice Guidelines and Technical Standards for Nuclear Medicine

SNMMI Practice Guidelines

NEMA NU 2-2012: Performance Measurements of Positron Emission Tomographs

ICRP Report 80

Essentials of Nuclear Medicine; Mettler and Guiberteau

Medical Imaging Physics; Hendee and Ritenour

Physics in Nuclear Medicine; Cherry, Sorenson, and Phelps

The Essential Physics of Medical Imaging; Bushberg, Seibert, Leidholdt, Boone

Protocols and Testing Procedures

ACR NM/PET Accreditation Documents and Procedures

ACR CT Accreditation Documents and Procedures

ACR Technical Standard for Diagnostic Procedures using Radiopharmaceuticals ACR–AAPM– SIIM TECHNICAL

STANDARD FOR ELECTRONIC PRACTICE OF MEDICAL IMAGING ACR-SPR Practice Guideline for the Performance of

Tumor Scintigraphy (With Gamma Cameras) ACR Practice Guideline for the Performance of Cardiac Scintigraphy

ACR Practice Guideline for the Performance of Therapy with Unsealed Radiopharmaceutical Sources

ACR Practice Guideline for the Performance of Adult and Pediatric Skeletal Scintigraphy

ACR Practice Guidelines for Radioembolization with Microsphere Brachytherapy Device (RMBD) for Treatment of Liver Malignancies

ACR-ASTRO Practice Guideline for the Performance of Therapy with Unsealed Radiopharmaceutical Sources

SNM Practice Guidelines for Breast Scintigraphy 2.0

SNM Practice Guidelines for Myocardial Perfusion Imaging 3.3

SNM Practice Guidelines for Parathyroid Scintigraphy 4.0

SNM Practice Guidelines for Thyroid Uptake Measurement 3.0

SNM Practice Guideline for Dopamine Transporting Imaging with ¹²³I-*Ioflupane* SPECT 1.0

SNM Procedure Guidelines for Radionuclide Cystography in Children 3.0

SNM Procedure Guidelines for Sodium ¹⁸F- Fluoride PET/CT Bone Scans 1.0

SNM Procedure Guideline for Lymphoscintigraphy and the Use of Intraoperative Gamma Probe for Sentinel Lymph Node Localization in Melanoma of Intermediate Thickness 1.0

NEMA NU 1-2007: Performance Measurements of Gamma Cameras

NUREG-1556, Volume 9, Consolidated Guidance About Materials Licenses: Program - Specific Guidance About Medical Use Licenses

U.S. Nuclear Regulations 10 CFR 35.75: Release of individuals containing unsealed byproduct material or implants containing byproduct material

U.S. Nuclear Regulations 10 CFR 35.92: Decay-in-storage

Journal Articles

A Seret et al., Quantitative capabilities of four state-of-the-art SPECT-CT cameras. *European Journal of Nuclear Medicine and Molecular Imaging Research* 2012;2:45.

F Giammarile et al., EANM procedure guidelines for the treatment of liver cancer and liver metastases with intra-arterial radioactive compounds. *European Journal of Nuclear Medicine and Molecular Imaging* 2011;38(7):1393-406.

M Hofmann et al., Towards quantitative PET/MRI: a review of MR-based attenuation correction techniques. *European Journal of Nuclear Medicine and Molecular Imaging* 2009;36:S93-104.

DePuey, Advances in SPECT camera software and hardware: currently available and new on the horizon. *Journal of Nuclear Cardiology* 2012;19(3):551-81.

Stabin et al., OLINA/EXM: the second-generation personal computer software for internal dose assessment in

nuclear medicine. *Journal of Nuclear Medicine* 2005;46(6):1023-7

T Pan et al., Attenuation correction of PET images with respiration-averaged CT images in PET/CT. *Journal of Nuclear Medicine* 2005;46(9):1481-7

CB Hruska et al., Nuclear imaging of the breast: translating achievements in instrumentation into clinical use. *Medical Physics* 2013;40(5)

W Erwin et al., Yttrium-90 microspheres therapy for hepatic malignancy: devices, indications, technical considerations, and potential complications. *Radiographics* 2005;25 Suppl 1:S41-55

E Frey et al., Accuracy and precision of radioactivity quantification in nuclear medicine images. *Seminars in Nuclear Medicine* 2012;42(3):208-18

N Pandit-Taskar et al., Bone-seeking radiopharmaceuticals for treatment of osseous metastases, Part 1: α therapy with ^{223}Ra -dichloride. *Journal of Nuclear Medicine* 2014;55(2):268-74.

Wrixon, New ICRP recommendations. *Journal of Radiological Protection* 2008;28(2):161.

Gelfand et al., Pediatric Radiopharmaceutical Administered Doses:2010 North American Consensus Guidelines. *Journal of Nuclear Medicine* 2011;42(2):318-22.

Hays et al., /MIRD dose estimate report no. 19: radiation absorbed dose estimates from. *Journal of Nuclear Medicine* (18)F-FDG 2002;43(2):210-4.

Madsen, Recent Advances in SPECT Imaging. *Journal of Nuclear Medicine* 2007;48(4):661-73.

Zanzonico, Routine Quality Control of Clinical Nuclear Medicine Instrumentation: A Brief Review. *Journal of Nuclear Medicine* 2008;49(7):1114-1131.