High quality is no coincidence. It is our commitment!

By Sabine Ettinger, MSc, EANM Research Ltd (EARL), Vienna, Austria, on behalf of the EARL Scientific Advisory Board

The European Association of Nuclear Medicine (EANM) is the umbrella organization of nuclear medicine in Europe representing this advanced health care sector for European healthcare institutions. The EANM aims at advancing science and education in nuclear medicine for the benefit of public health as well as proving the quality of nuclear medicine to clinical and industry partners. To this end, the EANM Executive Committee launched EANM Research Ltd (EARL) in 2006, a 100% subsidiary of EANM. The EARL initiative aims to enhance the quality of nuclear medicine clinical practice and research and to promote scientific initiatives as well as clinical research projects.[1]

EANM's strong commitment for the advancement of clinical nuclear medicine translates in several publications covering procedure guidelines.[2] One of these highly valued EANM guidelines is the *FDG PET and PET/CT: EANM procedure guideline for tumour PET imaging: version 1.0*, published in the *European Journal of Nuclear Medicine and Molecular Imaging (EJNMMI)* in 2010.[3] These widely accepted guidelines provide minimum standards for the acquisition and interpretation of PET and PET/CT scans with [18F]-fluorodeoxyglucose (FDG), which is also well represented within the draft of Uniform Protocols for Imaging in Clinical Trials (UPICT) as established by the Quantitative Imaging Biomarkers Alliance (QIBA).

PET/CT is a reliable imaging tool for the detection of various cancers within daily clinical practice.[4,5] Furthermore, it is essential in clinical and preclinical multicenter trials since molecular imaging biomarkers accelerate drug development by detecting drug activity and measuring efficacy. Finally, (quantitative) assessment of metabolic response to therapy, measured using FDG-PET/CT, not only supports drug development, but is being used increasingly more in clinical practice.

Based on the FDG-PET guidelines, the EANM established the FDG-PET/CT accreditation program in 2010 in order to support compliance with quality control requirements and quality assurance of PET/CT systems.[6] To ensure state-of-art scientific knowledge, the EANM hosts a working group to review and update FDG-PET guidelines. Furthermore the EANM Executive Committee as well as the EARL Scientific Advisory Board provide consulting services within the accreditation program and monitor its development.

The EARL FDG-PET/CT accreditation program is endorsed by the European Organization for Research and Treatment of Cancer (EORTC) Imaging Group and is a pre-requisite for some of its imaging trials.[7,8] Furthermore, an increasing number of CROs and pharmaceutical companies are endorsing EARL FDG-PET/CT site accreditation for their clinical trials. To date, over 80 PET/CT centers across Europe are participating in the EARL FDG-PET/CT accreditation program, of which more than 70 received their EARL accreditation.

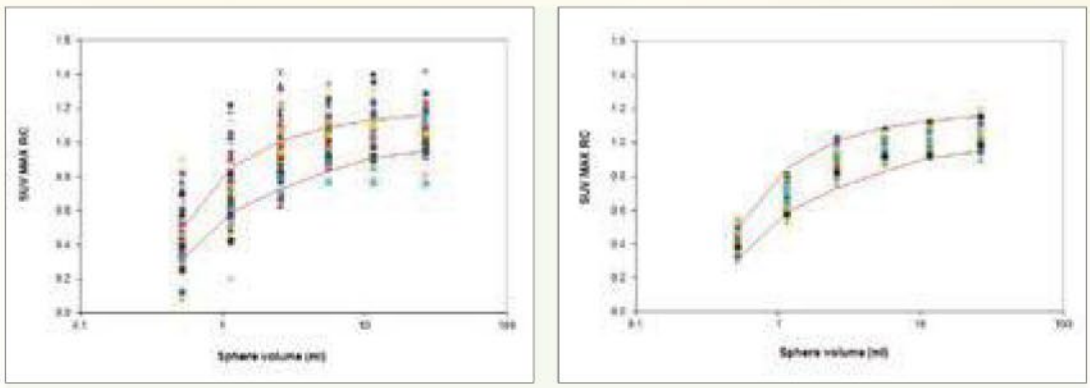

Figure 1: SUV_{max} recovery coefficients (RC) as function of sphere volume seen before and after completing the EARL quality control accreditation program. Red lines in the graphs indicate upper and lower EARL performance specifications. Data is pooled over all accredited sites and from all major PET/CT vendors. The figure on the left demonstrates a more than two-fold variability in quantitative PET/CT system performance before accreditation (pooled data prior to granting accreditation). Harmonized quantitative PET/CT system performance within EARL specifications is achieved by the EARL FDG-PET/CT accreditation program.

Several trials are requiring the EARL FDG-PET/CT accreditation in order to ensure a comparable scanner performance across multiple sites. This is achieved through harmonization of the acquisition and interpretation of PET/CT scans (minimizing inter-/intra-institute variability in standardized uptake values - SUVs), providing lower/upper limits of recovery coefficients and a calibration factor within +/-10%, therefore, enabling results to be compared, exchanged, and combined.[9,10]

Moreover, accurate, reproducible, and quantitative assessment (Figure 1) is enabled through standardization of imaging procedures and methodology, including patient preparation, scan acquisition, image processing, and analysis, which is of utmost importance for quality assurance in daily clinical practice as well as multicenter trials. Accredited centers of excellence strengthen their status via publication on the EARL website, a signet sticker, and an accreditation certificate.

Members of the EARL scientific advisory board:

- Andrea Bauer, MA, EANM Executive Director/CEO of EARL, Vienna, Austria;
- Prof. Ronald Boellaard, PhD, VU University Medical Centre, Amsterdam, The Netherlands;
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- Prof. Jure Fettich, MD, PhD, University Medical Center, Ljubljana, Slovenia;
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- Prof. Klaus Tatsch, MD, Municipal Hospital Karlsruhe Inc./ CEO of EARL, Karlsruhe, Germany;
- Prof. Fred J. Verzijlbergen, MD, PhD, Erasmus MC, Rotterdam, The Netherlands. ■

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Members of the EARL FDG-PET/CT accreditation program working group:

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Medical Physicist, Department of Radiology & Nuclear Medicine, VU University Medical Centre, Amsterdam, The Netherlands. Chair of EANM Physics Committee, member of working group for UPICT, QIBA FDG PET/CT technical committee, and member of the EORTC imaging group. He is the founder and scientific leader of the EARL FDG-PET/CT accreditation program and has published several papers on standardization and harmonization in high ranking journals.

Sabine Ettinger, MSc

Project Manager of EARL, Vienna, Austria. Her main duty at EARL is the management of the EARL FDG-PET/CT accreditation program with regard to financial, organizational, and administrative issues. Furthermore, she oversees communication, marekting, and professional relations with sites, industry, and other scientific societies.

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Medical Physicist, Radiation Safety Officer, Department of Nuclear Medicine, University of Szeged, Hungary. Radiation expert for Hungarian National Accreditation Committee and IAEA-trained quality auditor for nuclear medicine facilities. She is responsible for the data analysis within the EARL FDG-PET/CT accreditation program and is the main contact person for scientific questions from sites with regard to phantom preparation, phantom acquisition, and QC results.