odology, using a single reconstruction for both qualitative and quantitative analysis optimised to maximum lesion detectability, and then applying an intrinsic post-reconstruction algorithm for SUV harmonization. **Materials and Methods:** Phantom measurements and subsequent patient data analysis were performed on a Siemens Biograph mCT system equipped with LSO crystals, PSF and TOF algorithms and on a 10-years old General Electric Discovery STE system equipped with BGO crystals. A dedicated algorithm (EQ-filter) quantification technology was tested to harmonize SUV values between scanners and also in relation to the EAMN/EARL specifications. For phantom measurements we used a NEMA IQ phantom and a Jaszczak phantom equipped with small fillable spheres (lesion to background ratios of 8:1 and 4:1). Several different reconstruction settings were used in order to provide a general methodology independent of the specific protocol adopted in our institution. Data obtained by phantom measurements were validated on seven oncologic patients who accepted to perform one-bed extra acquisition on a different scanner. The evaluation regarded 39 small hot lesions (diameters ranging from 0.3 cm to 2.6 cm) and was performed by two experienced nuclear medicine physicians. **Results:** The main benefit of PSF+TOF PET/CT systems is the increased percentage contrast of small lesions. On the other hand, the curves of recovery coefficients (RCs) measured according to NEMA standards exceeded those obtained by the OSEM reconstruction. Discrepancies in SUVmax values between the two PET/CT systems were as high as 149%, while they drop below 10% applying the optimized value of EQ.filter. For each scanner and reconstruction setting the optimal value of the EQ.filter was identified in order to minimize these discrepancies. Patient data, analyzed by Wilcoxon statistical test, confirmed phantom measurements. **Conclusion:** the use of a single reconstruction optimized to maximum lesion detectability with EQ.filter is an easy and convenient solution to harmonize semi-quantitative measurements, avoiding a second reconstruction with an additional smoothing filter as suggested by EAMN/EARL.

OP-176

Results of a nationwide phantom based PET-Survey in Switzerland before harmonization

B. Klaeser[1,2], G. Prenosil[1], M. Hentschel[1], M. Fürstner[1], T. Krause[1], A. Rominger[1], T. Weitzel[1]; [1]Department of Nuclear Medicine, Inselspital, Bern University Hospital, University of Bern, Bern, SWITZERLAND, [2]Department of Radiology and Nuclear Medicine, Winterthur Cantonal Hospital, Winterthur, SWITZERLAND.

Aim: To gain an overview about the variability of PET measurements with diverse PET/CT-systems used in Switzerland, and to provide an inventory on acquisition protocol adherence in a multi-centre setting. **Materials and methods:** A total of 28 PET/CT sites in Switzerland was invited to participate in a PET phantom survey. Based on obligatory semiannual phantom measurements as prescribed by the Federal Office of Public Health in Switzerland, a detailed study protocol defined PET acquisitions of two different durations with a homogeneous cylinder phantom (activity concentration (AC) 10 kBq/ml) and a fillable "hot spheres" (18F) phantom (3.5 kBq background AC; sphere to background ratio 5:1). At least 7 image reconstructions for each acquisition (28 per study site) were requested. Reconstructions included sets of standard (4mm, isotropic) and high resolution (2mm, isotropic) reconstructions, using filtered back-projection (FBP), ordered subset expectation maximization (OSEM) and vendor specific point spread function (PSF) based reconstructions. Data of all sites underwent automatic quality control (QC) utilizing an in-house developed multi-paradigm software and were analyzed with regard to comparability of measured AC. **Results:** Phantom data was provided by 14 of 28 PET sites (5/5 university hospitals, 7/13 cantonal hospitals, 2/9 private hospitals). From 18 PET devices, 459/504 expected datasets (92%) were received and underwent QC. Of these, 6 datasets were not readable, and 31 datasets were not accepted (e.g. no attenuation correction), resulting in 422 evaluated datasets. 257/422 (61%) datasets were of restricted use for quantification because of protocol violations (e.g. strongly anisotropic voxels, filter parameters or AC out of proposed range, faulty exposure and axial or radial offset of phantom spheres), and/or actual background AC was not provided in 160/422 datasets (38 %). We found high variations in prepared actual or presupposed phantom AC and in recovery of AC, latter depending on reconstruction methods and reconstruction parameters (e.g. isotropy of voxels). Device-specific acquisition parameters - in terms of exposure per reconstructed voxel size - had a major influence on inter-site comparability of quantitative PET measurements. Underexposed PET acquisitions lead to faulty quantification of AC. **Conclusions:** As expected from comparable studies, the nationwide Swiss phantom survey also found considerable variation in PET AC quantification. In the context of multi-centre trials, protocol compliance may not be assumed. Thus, a throughout QC of all datasets appears to be mandatory to assure data quality and comparability. In addition, quantitative PET data may only be used after check of adequate image exposure.

507 **Sunday, October 14, 2018, 16:30 - 18:00, Hall 1**

Teaching Session 2 - Interactive Clinical Cases: Lung Anatomy and Patterns of Lung Malignancy

OP-177

Anatomy of the Thorax and Relevant Anatomy of Most Common Metastatic Sites

A. Eccles; Guy's and St. Thomas' Hospitals NHS Foundation Trust, London, UNITED KINGDOM.

OP-178a

Patterns of Lung Cancer and False Positive/Negative Patterns

A. Eccles; Guy's and St. Thomas' Hospitals NHS Foundation Trust, London, UNITED KINGDOM.

OP-178b

Patterns of Lung Cancer and False Positive/Negative Patterns

T. Lynch; Belfast, UNITED KINGDOM.