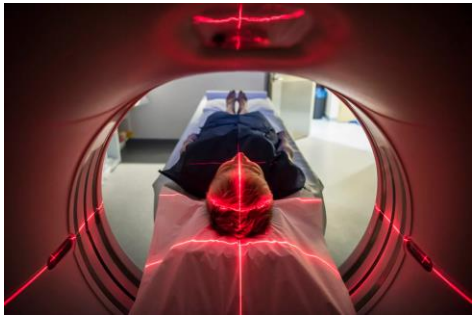
Proposal of a quality assurance program for PET-CT system

By Rosa A. Petit S.



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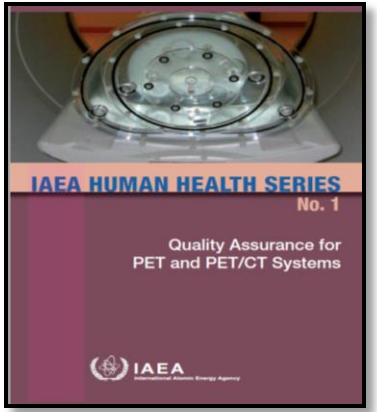


NEMA NU 2-2007

PERFORMANCE MEASUREMENTS OF POSITRON EMISSION TOMOGRAPHS

NEMA NU 2-2012

Performance Measurements of Positron Emission Tomographs

AMERICAN ASSOCIATION of PHYSICISTS IN MEDICINE

Improving Health Through Medical Physics

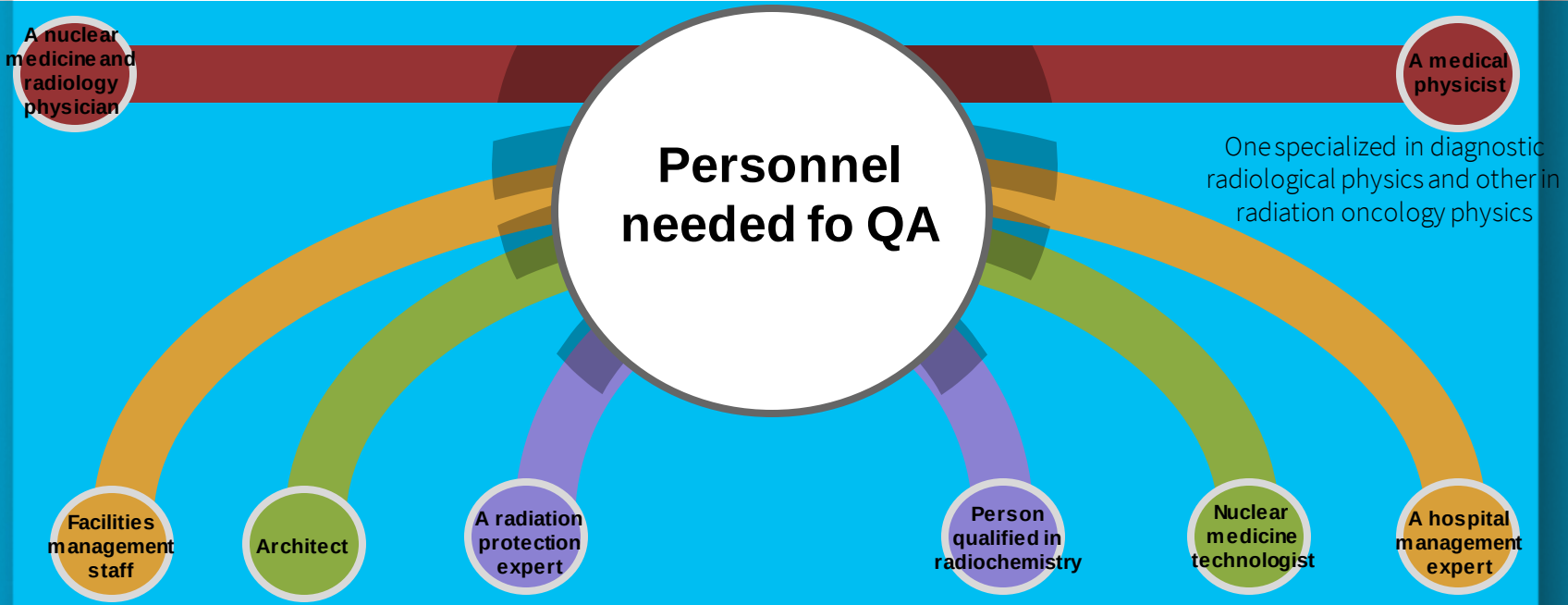
AAPM COMMITTEE TREE

Task Group No. 126 - PET/CT Acceptance Testing and Quality Assurance (TG126)

» QMS – Components

- Definition of responsibilities for defined actions
- Instruction of the correct use of equipment, and test objects, phantom and source and procedures to follow for abnormal results
- Records of all the tests, calibrations and corrective actions performed
- Proper training of all staff involved in the correct and safe of the equipment

» Professionals Involve



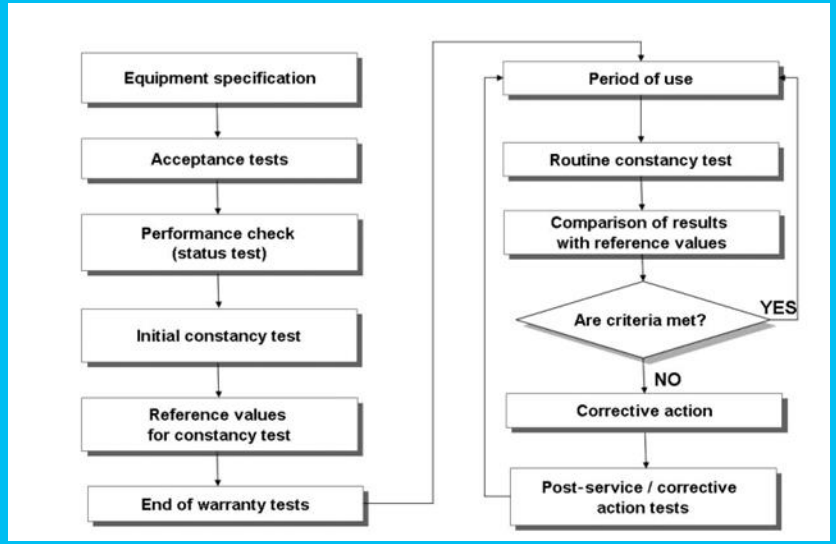
» Important aspects in QA

Quality assurance may encompass various aspects such as quality of medical care based on specific indicators as:

- **The infection rate in the hospital.**
- **The satisfaction of patients with this care.**
- **The credential of medical staff.**
- **Any continuing education of the personal staff.**

» QA and QC cycle

The quality assurance and quality control cycle for a medical imaging device



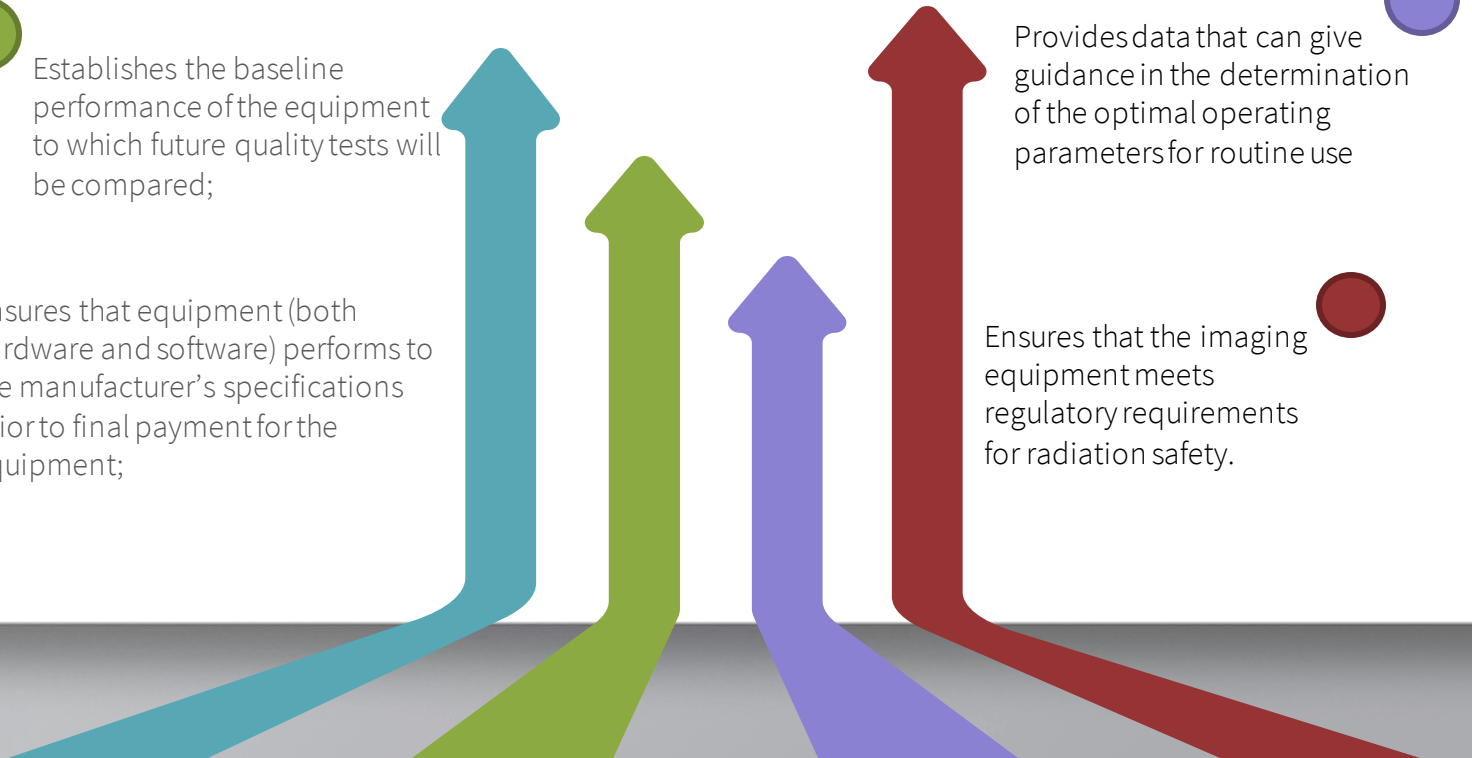
III. Acceptance testing

Establishes the baseline performance of the equipment to which future quality tests will be compared;

Ensures that equipment (both hardware and software) performs to the manufacturer's specifications prior to final payment for the equipment;

Provides data that can give guidance in the determination of the optimal operating parameters for routine use

Ensures that the imaging equipment meets regulatory requirements for radiation safety.



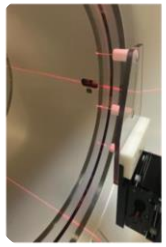
NEMA NU2:

- Spatial resolution
- Sensitivity
- Scatter fraction/ count rate performance
- Image quality

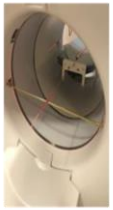
ADDED TG No.126:

- ACR (replaced image quality)
- Uniformity
- Alignment

IV. List of QA/QC test

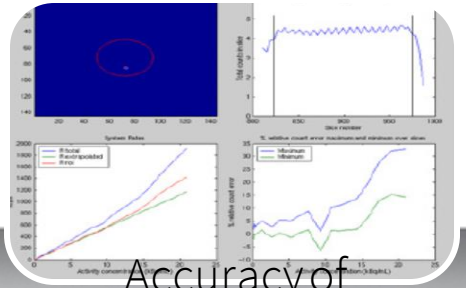


Spatial resolution



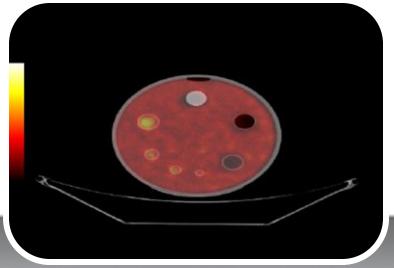
Sensitivity

Scatter fraction



Accuracy of count losses

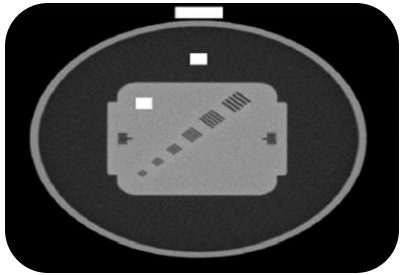
Uniformity



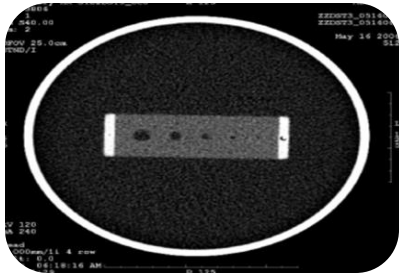
Alignment

V. Other important QA/QC test

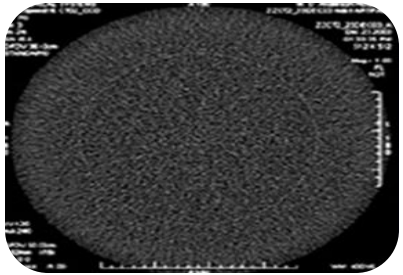
- Linearity
- Low contrasts resolution
- Artifact analysis



Linearity



Low contrast resolution

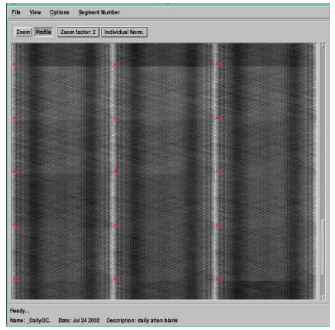


Artifact

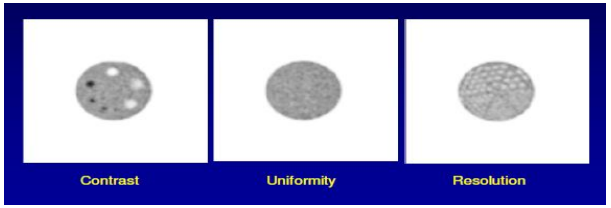
VI. QC schedule

Daily
Check singles, coincidences, timing, energy
Sinograms, tube warmup, daily air cals and daily phantom scan
Weekly
Update gains
Quarterly
Normalization and counter calibration
Annually
ACR or NEMA test, TG No.126

Pre-calibration phantom



Sample sinograms



ACR phantom images

Thanks so much!