

AbstractID: 13002 Title: Performance assessment of X-ray QA instruments used in mammography

**Purpose:** To establish the calibration standard of dose and kVp meter for performance assessment of mammography X-ray QA instrumentation and to evaluate the uncertainty and the impact of X-ray spectrum variation in different beam qualities.

**Method and Materials:** The accuracy of instruments calibration forms the first step to determine the quality control trains in national survey. The primary standard for dose and kVp meter for X-ray beams was obtained from a free air ionization chamber and high voltage divider. The uncertainty analysis followed the method recommended by the ISO Guide. The beams qualities were at 23-35kVp produced by Mo target X-ray sets with 30  $\mu\text{m}$  Mo filtration and Rh target X-ray with 29  $\mu\text{m}$  Rh filtration. Dose verification was conducted by mammography ionization chambers which were previously calibrated by the NIST. Three different techniques were compared: spectrum end-point direct measurements, calibrated non-invasive kVp devices and the calibrated voltage divider technique. **Results:** Acceptable agreement (difference within 1%) was obtained in the mammography X-ray range. Agreement among these methods was good with a difference less than 1% for all beam qualities. The uncertainty estimates results of the dose and voltage values calculated respectively from the measured spectra and voltage divider technique are less than 3% for voltage range of 23-35 kV. **Conclusions:** This technique is capable of providing quality services required by quality assurance standards in mammography, namely, the indicated values should be within 5% of the delivered values. The low uncertainties associated with the obtained results in this work pointed out that the method employed can be accurately used for calibration of instrument in mammography. The performance characteristics of dosimeters and non-invasive kVp meters were determined for annual calibration in an attempt to ascertain the likely performance of instruments in routine use.