

**Purpose:** To establish a centralized database platform for radiotherapy quality assurance(QA). This can be an interactive platform where physicists can download digital benchmark cases from, perform radiotherapy planning and QA measurements with various planning and delivery systems, and upload the results. Data retrieval and analysis functions can then be developed for the quality assessment of the radiation plan and measurement in the context of prior data with similar planning, delivery and measurement technologies. Data mining of the system can in turn generate quantitative guidance for clinical trial QA requirements that have the optimum combination of stringent mandates and realistic accommodations.

**Methods:** Built upon prior experience of Task Group(TG) 119 from IMRT workgroup of AAPM, and digital data phantoms from EORTC, these groups collaborate with clinical trial work group of AAPM and advanced technology consortium (ATC) to establish a virtual QA environment within National Biomedical Imaging Archive (NBIA). Digital phantoms from TG 119 and EORTC dosimetric evaluation with DICOM image, structures, plan and dose were uploaded to the virtual QA environment for the established community to download and perform evaluation of basic dosimetric parameters including, structure volumes, geometric location of structure center, designated points on dose volume histogram (DVH). Nine different treatment planning or related systems with various versions are included in these evaluations.

**Results:** Volume variations among versions of these nine systems are 2.7%, 4.2%, 14.7%, 4.7% for prostate PTV, prostate, rectum and bladder respectively. DVH reading differences are 0.1%, 2.4% and 1.5% for prostate D95, rectum D30 and bladder D30. DVH reading differences for cube 10 are 1%, 86% and 100% for V0, V20 and V30 respectively.

**Conclusions:** A virtual QA environment has been established within NBIA for radiation oncology inter-system and inter-institution QA. Initial testing in reading geometric and dosimetric parameters identified significant variations among systems.