

Imaging and Radiation Oncology Core's development of a remote credentialing system for FLASH radiotherapy.

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Site qualification and credentialing evaluates institutional capabilities to deliver intended treatments in an accurate and consistent manner for clinical trials. With FLASH radiotherapy developing into a new way to treat cancer, a credentialing system needs to be established to review the dose, dose rate, and spatial information of FLASH deliveries. For the purpose of evaluating UHDR delivery in the multi-institutional clinical trial setting, IROC is developing a FLASH credentialing program. This program will be developed to facilitate monitoring of electron and proton FLASH, as well as kV and MV photon systems. This program will include many elements, including an institutional survey based on IROC's long standing survey system to gather information related to institutional capabilities. IROC's program will include evaluation of dose delivery based on TLD, OSLD, and film. Additionally, a remote dose rate assessment tool is being developed in the context of an end-to-end anthropomorphic phantom. This dose rate assessment tool will consist of a microprocessor and a detector, such as a diode, to quantify and record the timing information of the radiation delivery. To date, TLD have been irradiated by several proton FLASH beamlines and have shown agreement with the traditional IROC +/-5% tolerance for beam output audits. The remote audit dose rate assessment tool has been able to measure the pulse train timing resolution of electron beam lines to 1microsecond timing resolution, showing a percent error in the total beam on time of less than 0.7% when compared to beam current transformers for pulse trains consisting of two to five pulses and pulse repetition frequencies from 30Hz to 120Hz. IROC will continue to develop this infrastructure to ensure suitable accuracy in dose and timing measurements. This will ensure that IROC has appropriate capability to support clinical trials and ensure accurate and consistent UHDR radiotherapy delivery.