

The Council on Ionizing Radiation Measurements and Standards (CIRMS) represents users of ionizing radiation and radioactive sources engaged in medical radiation and other programs. CIRMS provides a forum for discussing ionizing radiation issues; identifying, defining and prioritizing needed work for standards; disseminating information on standards; and organizing workshops and meetings to advance ionizing radiation technology. The National Institute of Standards and Technology (NIST) is heavily involved with this organization and considers its directives as statements of work to be completed. A presentation of the research and measurements made for standards for Medical Radiation Therapy Applications will be summarized addressing three major topics: Absorbed Dose to Water Calibration, Brachytherapy seed calibrations and calibrations for intravascular applications. Each of these standards is described in Measurement Program Descriptions (MPD), which are statements of requirements and the reasons for the measurements. Discussion of the measurements to determine an absorbed dose to water in-phantom calibration, in support of AAPM's new protocol written by TG-51, will be presented. NIST's role was to establish the U.S. standard linking the Dosem water calorimeter to measurements made with ionization chambers. This process will be discussed along with results from recent international comparisons. The transfer of this standard to the ADCLs will also be discussed in line with the AAPM task group for this purpose. Also presented will be the results from the ADCL round-robin proficiency test conducted by NIST. Recently there has been a great deal of activity on low energy brachytherapy seeds for prostate treatments. The recent change in brachytherapy I-125 source calibrations is a result of measurements made with the Wide Angle Free Air Chamber (WAFAC). The design and use of this free air chamber to measure low energy brachytherapy seeds, including Pd-103 will be given. A new area of activity has been for the prevention of restenosis after angioplasty with the use of radioactive sources. The AAPM Task Group 60 has indicated the importance of calibration of such sources. The system for standardized dosimetry for intravascular brachytherapy sources will be discussed, emphasizing the developmental work which has been performed and which continues at NIST. Calibration methods for these sources are evolving almost as fast as the sources are being developed for this application. The challenges are the very close distances to the very small sources at which dosimetry is required, and the large number of isotopes and source geometries now under active investigation. Finally a review of the regulatory issues with sources used in radiation therapy will touch on three areas of regulatory concern from a physics point of view: (1) IDE requirements for studies involving intravascular brachytherapy, (2) brachytherapy sources with emphasis on those low energy sources used to treat prostate cancer, and (3) well ionization chambers. While this talk will focus on the issues from the FDA/CDRH point of view, the NRC also has concerns in these areas that will be mentioned.

Educational objective: An understanding of equipment and methodology involved in the establishment of standards for Radiation Therapy Applications.