AbstractID: 7922 Title: Determination of Dose from CT Examinations
CT dose.doc

The assessment of radiation dose from computed tomography has become an important issue due to the increased utilization of computed tomography in a large number of clinical applications, from CT urography to cardiac CT. The traditional metrics used for CT dose assessment (CTDI-100) have come under assault from a number of investigators, because of its limitations in describing the radiation dose in realistic CT examinations. While there remains no real consensus in the field, a number of groups are working on the development of CT dose metrics which convey a better understanding of the radiation dose received by individual patients for specific CT examinations. In this presentation, the perspective of a number of groups will be presented. Primarily, the work of a committee of the International Commission of Radiological Units (ICRU) commissioned in 2005 will be discussed.

The ICRU committee has preliminarily defined a multi-tier system for the assessment of radiation dose metrics in computed tomography. At the first level, machine-dependent performance factors are described and measured, and these include the traditional CTDI-100 metric for the 16 cm and 32 cm diameter polymethylmethacrylate dosimetry phantoms, at the center and at the periphery. There is a consensus amongst the ICRU community that radiation dose to patients undergoing CT examinations is best established using the known geometry of the CT examination, coupled with measured output characteristics of the specific CT scanner (including bow-tie characteristics), combined with Monte Carlo computations. In the rare instance in which the CT dose to a specific patient needs to be computed, image-based methodologies will be presented which enable these computations with a high degree of accuracy. It is emphasized that the effective dose (measured in milliseiverts) is not an appropriate measure for individual patient doses, as this metric includes population-based radiation epidemiological data which may not be applicable to a specific individual. Therefore, the ICRU efforts towards radiation dosimetry of the individual patient focus on dosimetric units which are physical in nature, and describe the individual organ doses and the overall average dose to the patient, depending upon the specific CT examination and the patient's physical characteristics.

Educational Objectives:
Convey some of the issues in accurate dose assessment in CT

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Describe some of the ongoing efforts of the ICRU committee on CT towards dose assessment