AbstractID: 7486 Title: Measuring Kerma-Area Products (KAP) in CT

Purpose. To determine Kerma-Area Product (KAP) for head and body CT examinations, and compare these with KAP of common radiographic and fluoroscopy examinations.

Method. A single projection in CT is analagous to a conventional radiograph; for both exposures, the average incident air kerma may be multiplied by the corresponding cross-sectional area that intercepts the patient to obtain the projection KAP. Summing all projections in a CT examination enables CT examination KAP to be determined. Measurements of the absolute intensity of the CT beam was obtained at the scanner isocenter ($CTDI_{air}$), together with relative intensities on a line perpendicular to the long patient axis (z-direction). The beam cross-sectional area was determined using the known geometry of the CT scanner combined with eliptical shaped head and body dimensions of adult patients.

Results. CT KAP values for head and body examinations were ~10 Gy-cm^2 and ~25 Gy-cm^2, respectively. For compariosn, average values in the 2000 UNSCEAR report were: (a) ~1 Gy-cm^2 for head/chest radiographic examinations; (b) ~5 Gy-cm^2 for abdominal radiographic examinations; (c) ~20 Gy-cm^2 for barium studies; (d) ~100 Gy-cm^2 for interventional procedures.

Conclusion. Measurement of the CT output, and the corresponding x-ray beam profile transmitted through the beam shaping filter, permits the determination of KAP values for CT examiantions. Specifying KAP as a measure of the radiation incident on patients undergoing CT examaniations would unify CT dosimetry with current practice in radiography and fluoroscopy.