Body of Abstract: Introduction Interventional cardiology contributes a significant proportion to the collective effective dose to the population from medical exposures. Its frequency is increasing every year as knowledge of its benefits becomes more widely spread and more complicated procedures are technically possible. The purpose of this study was to propose a local reference level and to estimate the maximal skin dose and the effective dose for cardiac electrophysiological procedures.

Material and methods: Data from 74 patients were studied in the invasive electrophysiology lab of the University Hospital of Leuven. The procedures were divided in 4 subgroups: EPS (diagnostic electrophysiological study), RFCA (Radiofrequency Catheter Ablation) without and with angiographic images and, AF (atrial fibrillation) The procedures were performed on a Siemens Coroskop Biplane. Data included: dose area product (DAP), fluoroscopy time, number of cine, patient age, weight and height. Skin dose measurements were performed on a patient subgroup. Average, median, 3rd quartile and maximal DAP values were calculated for procedures.

For maximum skin dose (MSD), measurements are based on TLD (thermoluminiscent dosimeter) arrays. For estimation of the effective dose, we used Monte Carlo simulation tools (MCNP code).

Results: The fluoroscopic times were highest for the AF procedures (mean 78 min, median 79 min, maximal fluoroscopic time 130 min).

Averaged DAP values were: (1) for EPS 698 cGycm2 (3rd quartile 870 cGycm2, max 2529 cGycm2); (2) for RFCA without angiographic images 1866 cGycm2 (3rd quartile 1951 cGycm2, max 8695 cGycm2); (3) for RFCA with angiographic images 3387 cGycm2 (3rd quartile 3963 cGycm2, max 10117 cGycm2) and (4) for AF 19725 cGycm2 (3rd quartile 24396 cGycm2, max 44017 cGycm2).

Dose area product values far above a trigger level of 30000 cGycm2 (reference V. Neofotistou et al., published online in European Radiology, February 2003) were seen in 5 patients. Maximum skin dose was below the threshold for deterministic effects.

Discussion: Local reference levels can be based in a first approach on the 3rd quartile. Present study shows important differences for the different procedures. Only a very selected number of studies is available in literature: Broadhead (Br.J.Radiol. 70, 492-497, 1997) reports a local reference level of 6400 cGycm2 for RF ablation. Neofotistou reports 11600 cGycm2 for the same procedure (Radiat.Prot.Dosim. 80, 150-154, 1998).

For diagnostic and regular ablations, the DAP are lower than reported. For complex and extensive procedures (like AF ablation, which requires ablation of 5 different targets) DAP may be very high.