Some complex fluoroscopy guided interventions procedures require extended fluoroscopy times, i.e. longer than 30 minutes. In these cases radiation exposure of patients and medical staff is sometimes rather high. The risk of radiation induced skin injuries on patients implies that radiation protection for fluoroscopy guided interventions should not only be focused on stochastic effects, but also on potential deterministic effects.
This nation-wide Dutch dose survey at all 7 hospitals that perform catheter guided ablation of cardiac arrhythmia's, aimed at measuring fluoroscopic dose and doserate and at identifying those units with a high fluoroscopic doserate.
The measurements involve entrance doserate on PMMA phantoms of varying thickness, entrance doserate at the image intensifier and depth-dose in a PMMA phantom. For a 21 cm thick PMMA phantom, the entrance doserates varied for the different x-ray tubes from 3 mGy/min to 49 mGy/min with an average value of 22 mGy/min. On a thick PMMA phantom doserates up to 140 mGy/min were measured. The measured entrance doserates on the image intensifier varied from 0.2 µGy/s to 1.2 µGy/s with an average value of 0.6 µGy/s. The tenth-value thickness which were derived from the depth-dose measurements in PMMA varied from 11 to 14 cm. Deterministic skin effects are not expected at fluoroscopy times shorter than 45 minutes, even with the high doserates measured on the thick PMMA phantoms. Simple technical measures, such as decreasing the entrance doserate on the image intensifier and copper filtration, are effective means for reducing patient entrance dose.