Radiation awareness for endovascular abdominal procedures in the Hybrid OR: an instant risk chart to predict the deterministic radiation skin risks

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**Goal**
How long can we use X-ray radiation fluoroscopy or Digital subtraction angiography (DSA) until the 2 Gray patient skin dose threshold in (complex) EVAR is reached?

**Data**
- Hybrid OR with Philips Allura FD20 Clarity
- Abdominal protocol
- Endovascular aortic procedures
- 75 patients, including 17930 X-ray runs
- Air Kerma (AK_run, mGy) ~ power of the X-ray ~ deterministic (short term) skin risk for the patient (measured at the interventional reference point)

(1) Outcome: DR_{run} (mGy/s) = AK_{run} / Time_{run}
(2) Divided by: Fluoroscopy and DSA
(3) ModelType: uni- and multivariable log-linear mixed effect model
(4) Radiation predictors input: C-arm Rotation + Angulation + BMI + X-ray field size + protocol + SID (air gap) + Fluoroscopy protocols: “Low” vs “medium” vs “Normal” / DSA protocols: 2 frames/s vs 3 frames/s (fps)
(5) Predict with the model the amount of X-ray radiation minutes until the cumulative AK of 2 Gy in each configuration is reached

**Conclusion**
An instant radiation risk chart, based on the air kerma dose rates model, that provides insights in the real-time intraoperative radiation dose rates of the X-ray Fixed C-arm