

## Optimisation of radiological protection in a complex hybrid environment using detailed dose rate information

C Lundh<sup>1,2</sup>, M Båth<sup>1,2</sup> and A Almén<sup>1,2</sup>

<sup>1</sup>*Department of Radiation Physics, Institute of Clinical Sciences, Sahlgrenska Academy at The University of Gothenburg, Gothenburg, Sweden*

<sup>2</sup>*Department of Medical Physics and Biomedical Engineering, Sahlgrenska University Hospital, Gothenburg, Sweden*

**Purpose:** Physicians performing image-guided interventions are exposed to one of the highest radiation risk levels in healthcare. Hybrid environments combine the imaging technology of the image-guided interventions with operation environments, engaging more medical specialties to the use of advanced imaging devices. This complicates the risk management of radiological protection. The aim of this study was to explore the possibilities of using dose rate data for risk assessment in a multi-purpose hybrid room.

**Method:** Dose rate data was collected for three types of image guided interventions in a hybrid room at Sahlgrenska University Hospital. The three procedure types studied were EndoVascular Aortic Repair (EVAR), Transcatheter Aortic Heart Valve (TAVI) and an orthopedic procedure of the back (Ort Back). Dose rate data for scattered radiation was collected using an active dosimeter system, giving dose rate data with a time resolution of 1 second in a fixed unshielded point on the C-arm. Data was analysed and visualized as histograms.

**Results:** The dose rates varied substantially between the three types of procedures studied. The median dose rates were 2.3 mSv/h (EVAR), 1.4 mSv/h (TAVI) and 0.1 mSv/h (Ort back). During EVAR-procedures the absolute majority of the dose rates were between 1 and 10 mSv/h while it during Ort Back-procedures was dominated by dose rates below 0.1 mSv/h.

**Conclusions:** A multi-purpose hybrid room have dose rates that vary substantially between the different areas of use, both regarding dose rate levels and dose rate distribution. The use of dose rate information adds important information that can improve the management of risk in these environments.