

Purpose: To examine the role that detailed machine logs, supplementary procedural documentation and vendor-generated technique and dosimetry information can play in refining calculation of peak skin dose for sentinel event investigations.

Methods: Vendor-specific machine logs, skin-dose estimations, and procedural observations can supplement the fluoroscopic times and air kerma values that all fluoroscopic machines are required to report since 2006. Information available from vendors varies considerably, and in some cases specific application products must be purchased to access this information. Information embodied may include table position, c-arm geometry, collimation, individual run and fluoro acquisition dosimetry, technique factors (mA, kVp, pulse configuration), mode of operation and other data. Peak skin dose estimates based on HIS/RIS data and DICOM image headers were compared to calculations supplemented by the detailed machine logs and vendor dosimetry estimates. Skin dose maps were generated from air kerma readings and from the DICOM information associated with each run. Assumptions are necessary in this approach to apportion the fluoroscopic contribution, which can be 80% of the air kerma. Corresponding skin dose maps were generated with inclusion of more detailed machine log data and the resulting peak skin dose location and magnitudes were compared.

Results: Significant deviations were observed between peak skin dose calculations based on DICOM information alone with attendant assumptions versus those obtained with more detailed machine log data. Detailed logs provide complementary information that replaces assumptions on fluoroscopic dose contributions with more reliable values.

Conclusions: Additional information from vendor's logs and dose-estimates and from other sources can increase the confidence in skin-dose calculations, but the specific assumptions made by both the physicist and the vendor in making such estimates must be carefully examined. The comparison enables the stand-alone assumptions to be validated and also allows evaluation of vendor dosimetry estimates.