

Purpose: Interventional procedures are growing in complexity and length. There is increased regulatory focus on medical radiation exposure. Medical physicists need data and advanced analytical tools that can help identify patient exams with high dose and can highlight practice patterns and trends that can lead to high dose exams.

Methods and Materials: A machine data monitoring tool (Innova Dose Reports) was developed for GE Innova fluoroscopy systems. The tool captures near real time detailed exam data including dose (air kerma), acquisition mode, protocol, duration, source to image distance, field of view, angulation, table height, and equivalent patient thickness. The tool provides monthly summaries and exam level detail. The data can be used to 1) monitor and manage dose, 2) quickly spot and correct undesirable trends, 3) benchmark with all other Innova systems in the GE installed base and 4) utilize dose more efficiently. For exams exceeding the threshold, an alert is sent following the exam, with details that can help estimate potential deterministic effects for the patient.

Results: Innova Dose Reports facilitated reduction of dose in a variety of clinical settings. We were able to achieve overall reductions in dose of up to 40% in one electrophysiology lab and 29% and 50% in two cardiac catheterization labs. In one of the cardiac labs, the number of cases exceeding 5Gy went from 14 to 3 while exam volume remained the same. In the other, average patient dose went from 1.6Gy to 1Gy. These reductions were the result of protocol adjustments, increased utilization of dose reduction features and clinical practice changes. There were no complaints of diminished image quality.

Conclusions: Innova Dose Reports help monitor and minimize patient dose. The detailed information provided (in conjunction with clinical information, dose reduction features and training) can pinpoint areas of opportunity for improvement.