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## The Value of Streamlining Protocol & Dose Management in Radiology



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The 2013/59/Euratom guidance mandates suitable documentation and quality assurance systems for all systems using ionising radiation. This regulation commonly applies to radiology departments in the clinical environment. Thus, each exam's radiation dose must be documented to meet regulatory compliance and be audited. Doses also vary by procedure. For instance, radiation doses in computed tomography (CT) vary according to the scanning protocols, which specify a specific exam, contrast delivery requirements, and how the exam is technically performed (i.e., optimal radiation dose, scan speed, etc).

Many radiation dose audits are performed manually and rely on the hospital radiology information system, paper logbooks, and PACS. Unfortunately, manual audits are time-consuming and often subject to transcription and unit errors.

Radiological departments running CT scanners also manage a multitude of scanning protocols often associated with multiple scanners, sometimes originating from different manufacturers. These protocols are continuously updated to increase dose optimisation, and these changes must be documented. Many large centres develop redundant protocols, many of which are inappropriately modified.

The need for regulatory compliance and proper protocol management highlights the value of highly developed protocol and dose management systems which can automate much of this work to reduce the time invested and errors. Below are three case studies using Siemens Healthineers teamplay solutions to address protocol and dose management.

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### **Department of Paediatric Radiology, Karolinska University Hospital (Sweden)**

Karolinska University Hospital Radiology and Imaging department had 17 CT scanners, including ten scanners from Siemens Healthineers, across two sites in Solna and Huddinge, Sweden. Before implementing teamplay solutions, the manual review of CT scan protocols led to many obsolete protocols and duplicates. In addition, each department varied in how protocols were reviewed. In total, manual protocol management for all the CT scanners required a couple of hundred work hours.

Given the manual nature of the review process, maintaining the traceability of protocol changes and their underlying rationale was challenging. This is a severe issue because all examination protocols must be approved and quality assured for image quality, radiation dose, and workflow to maintain regulatory compliance. Thus, version handling of protocols and dose reports must be documented to ensure the traceability of protocol changes.

Implementing the teamplay digital health platform made all information regarding protocol management centrally and remotely available and documented revisions with comments regarding change rationale. The platform decreased the effort to review and adjust the protocols for the 10 Siemens Healthineers CT scanners at Karolinska University Hospital by 90% (from up to a couple of hundred hours down to approximately tens of hours per year). This also corresponded to less scanner downtime for protocol adjustment.

### **Clatterbridge Cancer Centre NHS Foundation Trust (United Kingdom)**

teamplay Dose, an application hosted on the teamplay digital platform, is a dose management solution that audits radiation doses in CT. The system uncovered an underlying issue in the patient dose distribution in the chest abdo-pelvis singleseries examinations performed on the

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facility's Siemens Healthineers CT scanner. These were unexpectedly higher than the chest abdo-pelvis contrast, which has two overlapping acquisitions. Subsequent protocol alterations and exam optimisations led to a 17% mAs reduction from 180 to 150 with negligible loss of image quality in the examinations.

### **Radiology Department, Robert-Bosch-Krankenhaus (Germany)**

Robert-Bosch-Krankenhaus (RBK) wanted a central solution that could serve as a centralised dose management system for their entire institution. RBK was initially interested in teamplay's ability to process data from the PACS through a cloud-based platform, which eliminated the need to connect to every single modality separately. During the evaluation period, it became clear that teamplay could operate with systems from different manufacturers.

Additional advantages included an integrated system for documentation and a central, user-friendly overview of doses across protocols. In investigating past occurrences of exceedingly high doses, teamplay provided insight into their cause and reduced radiation doses overall. For example, radiation doses were reduced by 30% in oncology because teamplay allowed easy data comparisons between systems. RBK also noticed the integration of features that enable an analysis of system utilisation, which could help optimise scheduling examinations throughout the day to make workflows more efficient without increasing workload.

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