teamplay Protocols[1]

Simplify your protocol management to deliver high quality of care and standardization

Karolinska University Hospital

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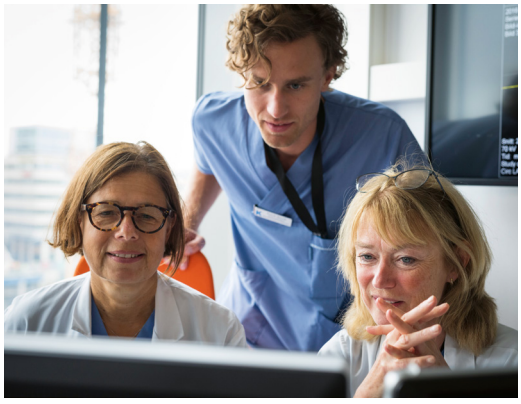
How Karolinska University Hospital saves time for protocol management and provides higher quality of care

Radiology departments – and CT practices in particular – quite frequently manage many scanning protocols. For enterprise-level practices or entire networks, the number of CT protocols can be in the hundreds. Each scanning protocol usually contains a huge variety of technical parameters that are specifically compiled for each scanner type and individual diagnostic tasks or cases. Scan protocols are also continuously amended and optimized to ensure accurate diagnoses that lead to successful therapies and the best possible patient outcomes. However, during optimization work and when dealing with large numbers of protocols and perhaps an entire fleet of scanners, protocols may be inaccurately or in some cases even inappropriately modified. This case study takes a deeper look into the challenges of protocol management and shows how Karolinska University Hospital implemented a successful centralized protocol management system that adheres to the highest quality standards and produces effective results for patients.



Challenge

Systematic quality reviews of CT protocols are required by law and are part of the quality assurance work at Karolinska University Hospital. The work is usually performed using manual methods like documenting protocol changes in Excel files or PDFs and categorizing them according to exam type for version handling, or not done at all due to resource constraints. These manual methods are time-consuming, inefficient, and prone to human error. Typically, no procedures can be performed while the protocols are being documented and modified at the scanners, resulting in workflow interruptions, reduced equipment utilization, and ultimately lower revenue. The challenge is therefore to enable systematic and efficient revision of CT protocols that doesn't adversely impact the clinical workflow and utilization of the scanners – and at the same time ensures compliance with regulations and delivers a higher quality of care.

Solution

To tackle this challenge, the department of Pediatric Radiology at Karolinska University Hospital has started to implement modern protocol management tools for its Siemens Healthineers scanners by adopting the Siemens Healthineers teamplay performance management applications.The teamplay Protocols[1] application provides remote access to imaging devices, and this enables central protocol management. It eliminates the need to manually obtain information onsite at scanners and helps provide high quality of care and standardization throughout the entire organization. It allows users to easily perform systematic quality reviews because all protocols and protocol history are in one place.

Initial situation: Highly manual quality review at Karolinska University Hospital

The protocol review processes at the Radiology and Imaging department at Karolinska University Hospital involved manual and time-consuming methods. The large number of protocols of the 17 CT scanners, including the 10 CT scanners from Siemens Healthineers, located at their two sites in Solna and Huddinge, Sweden, made it challenging to review and revise all protocols. The CT scan protocols at Karolinska University Hospital are precisely tailored to specific examinations in order to achieve lower dose levels while still providing high image quality. However, the main reason for the huge variety of protocols is the lack of a systematic protocol review process, which results in a high number of obsolete protocols whilst only very few protocols are actually frequently used. It is estimated that the majority of the protocols currently in circulation could be eliminated as they were for example only used in a few cases, never intended for use at all or just slightly differently named copies.

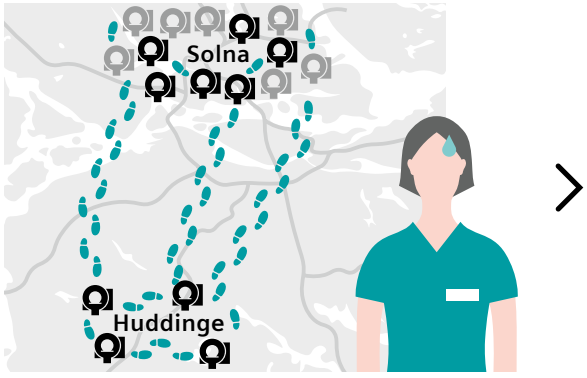
Exchanging protocols between scanners required many manual steps, resulting in a large variety of protocol settings across the scanners. Consequently, the same types of CT examinations could feature a different level of radiation and different image quality. However, the goal of providing an equal quality of care to each patient – regardless of what scanner is used for the examination – is very important to the hospital.

Especially when it comes to care at their department of children's health, it is crucial that all children get an equal treatment and high quality results, independent of the hospital location they visit. This can only be achieved with harmonized protocols.

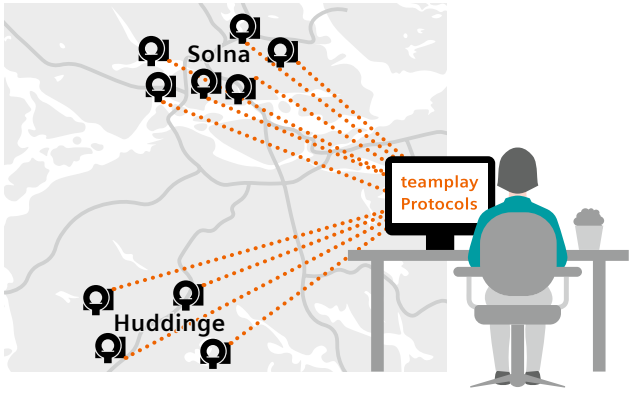
In addition, the process for protocol review varied widely, because every department had a different way of approaching the challenge, which is primarily influenced by the person in charge of it. Some departments, for example, used Excel sheets where they manually wrote down the scan protocol parameters. No matter how the departments chose to do it, the reviews usually required a significant amount of time spent on site at each scanner and examinations had to be stopped while the task was performed.

Manual methods also made it difficult to ensure the traceability of protocol changes and their rationale, regardless of whether they happened in the last week or two years ago, as well as the protocol used for a specific examination.

As a result, the estimated time per year needed for protocol management was up to a couple hundred work hours to serve protocol management for all CT scanners.[3]



Before teamplay, protocol quality reviews required going to each scanner individually to collect the data, which wastes resources and can lead to inconsistent results: CT scanners from Siemens Healthineers are represented by the black scanner symbols, CT scanners from other vendors are displayed in grey.



Central protocol management via remote access enables a high quality of care and standardization across the ten CT scanners from Siemens Healthineers that were connected to teamplay Protocols.

About Karolinska University Hospital

Karolinska University Hospital is one of Europe's premier health facilities. In 2020, Karolinska University Hospital was ranked tenth in the Newsweek "The world's best hospitals 2020" report. Along with the world-renowned Karolinska Institute, they are leaders in the development of advanced treatment scenarios and medical breakthroughs.[4]

The care provided at Karolinska University Hospital is organized based on medical theme areas and a number of functions. Thematic care puts the patient's collective medical needs into even greater focus. The care should create value for the patient, in close collaboration with the patients themselves.[5]

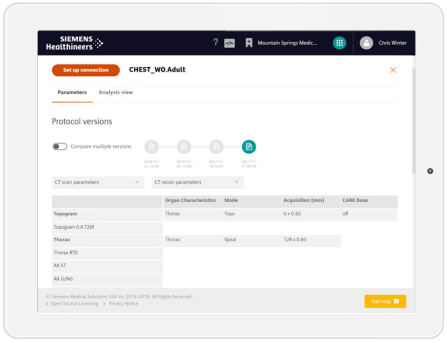
The Radiology and Imaging Function has responsibility for all of Karolinska University Hospital's care, research and training in the fields of Radiology, Medical Radiation Physics, Nuclear Medicine and Physiology. They have the latest and most advanced technology and their staff consists of more than 900 highly specialized doctors, nurses, physicists and biomedical analysts who are taking care of all activities in both Huddinge and Solna.[6]

The Karolinska University Hospital is closely affiliated with the Karolinska Institutet. The Astrid Lindgren Children's Hospital is also part of the Karolinska Institute and has, amongst others, premises in Solna as well as in Huddinge, where they focus on children's health.[7]

Quality and regulatory background

In Sweden, healthcare organizations need to be compliant with the Health Care Act, the Health and Medical Ordinance, the Patient Safety Act and adhere to the National Board of Health's regulations and the Radiation Safety Authority Regulations[2]. These regulations are intended to systematically integrate adherence to quality standards and promote continuous improvements to the operating framework of all healthcare institutions.

In the quality review, all examination protocols must be approved and quality assured for factors like image quality, radiation dose, and workflow. For example, the quality review includes version handling of protocols, dose reports, and ensuring the traceability of protocol changes.



"With teamplay Protocols, the systematic quality review of protocols is much more efficient, and it also allows us to be compliant with national legal regulations. Furthermore, it enables us to achieve consistency across our imaging fleet and to provide equal quality of care to all of our patients across our different departments."

Johan Helmenkamp
Medical Physicist, Karolinska University Hospital, Sweden[3]

New situation: Quality review and centralized protocol management at Karolinska University Hospital with teamplay Protocols

With teamplay Protocols, modern protocol management tools were made available to manage these challenges. This resulted in efficient protocol revisions for the 10 Siemens Healthineers CT scanners at the facility, which can be partially automated and therefore require less effort and less time spent on the modalities to accomplish the task. While it was previously difficult and time-consuming to keep protocols harmonized across the entire imaging fleet, teamplay Protocols now enables Karolinska University Hospital to achieve more consistency.

The hospital is now connected via the teamplay digital health platform, and all the required information is centrally available and remotely accessible, all in one place and in real-time. This means that the hospital staff doesn't have to physically visit each individual scanner across the various sites, which interrupts the scanning process, in order to gather relevant information for protocol quality reviews. The application teamplay Protocols facilitates fast and easy tracking and reporting of the entire version history of a protocol: every single adjustment is documented and can be traced back, without having to deal with manual documentation in Excel documents.

The option to add comments to each change in protocols has proven to be useful in this process, because the rationale for the change is recorded, which helps to understand the design philosophy behind an updated protocol. This feature also allows to detect accidental modifications. For example, if it's noticed that the image quality from a particular scan protocol has changed, it can be checked to determine if there were protocol alterations that led to the change, and if necessary, it can easily be reverted back to the previous protocol version.

teamplay Protocols also enables the evaluation and review of protocols to determine how each protocol alteration affects dose levels. This is again useful if a deviation in image quality is noticed: The application can then be used to see if changes in the protocol are the reason. This is also a vital factor in ensuring patient safety and allows the hospital to optimize patients' radiation exposure in order to achieve the highest image quality at the lowest reasonable dose level.

But not only the review process has been improved, teamplay Protocols also allows to centrally distribute protocols across the entire imaging fleet. Karolinska University Hospital now also has the possibility to use this feature to push out master protocols that were designed for specific exam types, to their scanner fleet, which will contribute to the consistency of their protocol design.

Objectives and expected benefits

A systematic quality review of protocols involves several steps – and these steps can be performed more easily with teamplay Protocols:

1. **Version management of protocols** to track and understand changes, comment on changed protocols, and return to previous protocol versions
2. **Provides accessible transparency** to discover protocol errors and inconsistencies in CT scan protocols
3. **Systematic documentation** of the design philosophy behind a protocol
4. **Minimizes the risk of errors** by easy access to protocol data and by providing access rights using user role management
5. **Edit protocols remotely** to quickly implement new protocols or make corrections
6. **Protocols are centrally distributed across the CT fleet** to increase consistency
7. **Smooth protocol optimization** and revision without interrupting the scanning process

Results and outcome

Protocol management with teamplay helps save time and better utilize resources, because it reduces the required work hours for protocol revision and minimizes interruptions during daily imaging operations with patients.

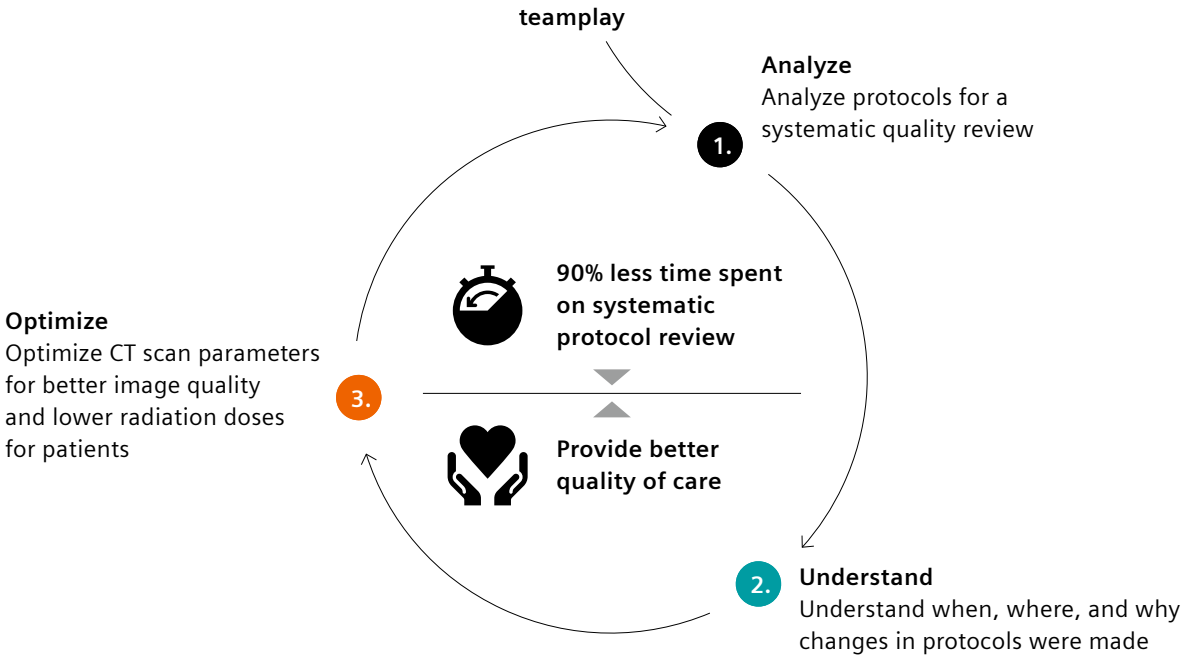
Using teamplay Protocols, the different departments and locations are now able to harmonize protocols, which leads to standardized and higher quality care for all patients. Based on the results of this first test phase, in which 10 Siemens Healthineers CT scanners are connected to teamplay Protocols, the effort to review and adjust protocols at Karolinska University Hospital is projected to decrease by around 90 percent, from up to a couple of hundred hours down to approximately tens of hours per year. This efficiency gain also shows in the increased scanner up-time which in return generates a significantly higher cashflow for the hospital, as more patients can be scanned per time unit.

In the long term, Karolinska University Hospital also intends to establish a continuous improvement process, implement best practices more systematically, and introduce remote editing and standardizing of protocols, followed by their immediate distribution across the entire imaging fleet. This also involves implementing teamplay Protocols for more departments.

Karolinska University Hospital also sees a huge potential for networking and exchanging protocols and expertise between different facilities and institutions. By enabling collaborations

via the teamplay digital health platform, Karolinska University Hospital will be able to exchange best-practice protocols with healthcare professionals all over the world, acquire valuable knowledge, and ultimately optimize its scan protocols even more.

These great results show how teamplay Protocols helps to meet today's challenges in hospitals and increase efficiency – which also results in tangible benefits for patients, such as higher quality of care and shorter wait times thanks to more efficient operations. ●



"The teamplay digital health platform represents a huge potential for a worldwide collaboration with other institutions on a scientific level. Our vision is to use it as a community sharing place where we can exchange best-practice protocols and build a growing network with other healthcare professionals."

Lena Gordon Murkes,
Department of Pediatric Radiology,
Karolinska University Hospital, Sweden[3]

[1] teamplay Protocols is an application for managing scan protocols and supports to edit protocols remotely by connecting to Expert-I or similar technologies. It doesn't directly influence the scanner in its operation. teamplay Protocols is for eligible Siemens Healthineers scanners only.

[2] The Health Care Act (2017: 30)
The Health and Medical Ordinance (2017: 80)
The Patient Safety Act (2010: 659)
National Board of Health and Welfare Regulations (2011: 9)
Radiation Safety Authority Regulations (2018: 1 and 2018: 5)

[3] Siemens Healthineers' customers' results described herein are based on results that were achieved in the customer's unique setting. Because there's no "typical" hospital and there are many possible variables (for example, hospital size, case mix, level of IT adoption), there can be no guarantee that other customers will achieve the same results.

[4] https://www.karolinska.se/en/karolinska-university-hospital/news/2020/03/1karolinska-university-hospital-number-ten-in-the-world/

[5] https://www.karolinska.se/en/karolinska-university-hospital/aboutkarolinska/our-themes-and-functions/

[6] https://www.karolinska.se/en/karolinska-university-hospital/aboutkarolinska/our-themes-and-functions/function-radiology-and-imaging/

[7] https://en.wikipedia.org/wiki/Karolinska_University_Hospital

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