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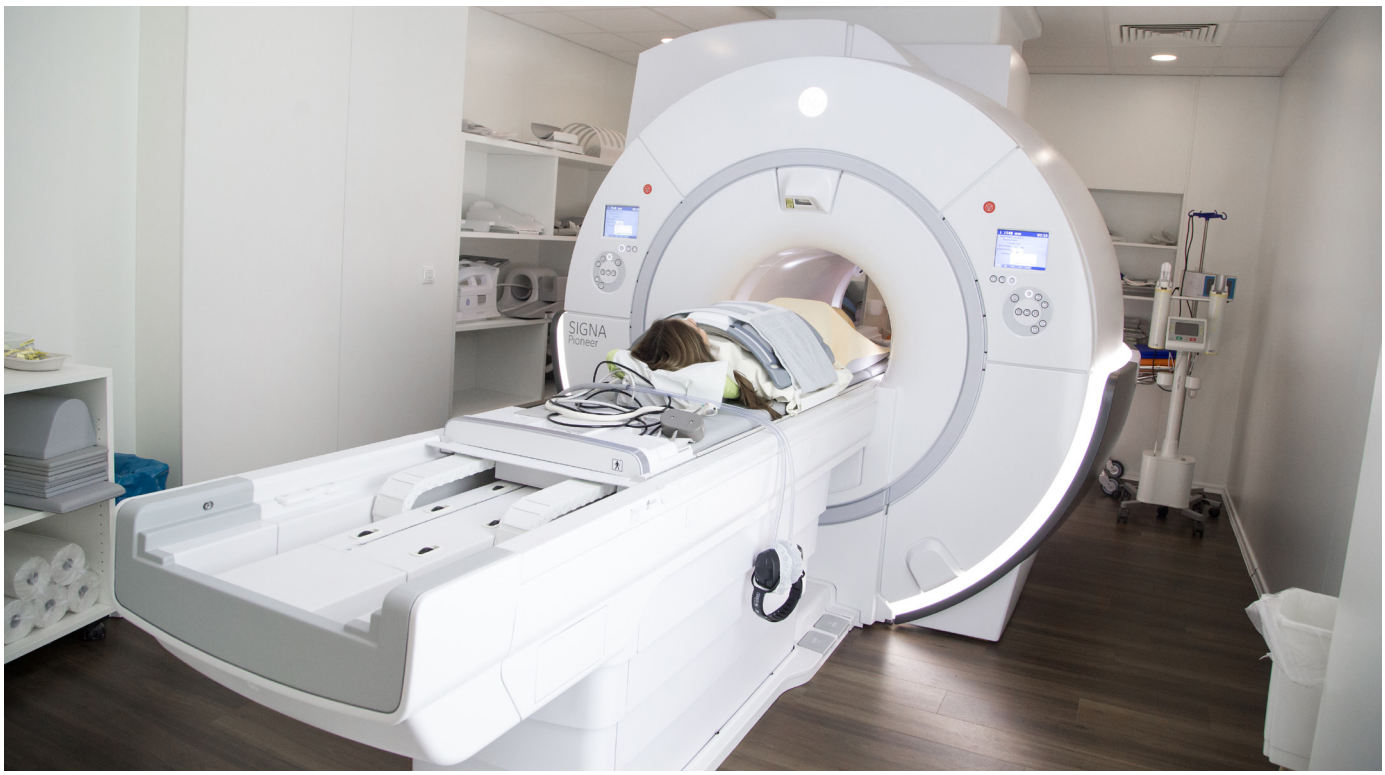
Cover Story

New Care Delivery

Workflow Optimization in Radiology: How AI is Helping Clear Waiting Rooms

Hospitals and Medical Practices Benefit from Custom Software Solutions

An overview of the implementation of a GE Healthcare analytics platform at a radiology practice in the German RheinMain region and the Institute for Radiology, Kantonsspital Aarau, Switzerland.



Business Intelligence (BI) and Artificial Intelligence (AI) allow medical practices and hospitals to achieve significant increases in efficiency. Implementation of a GE Healthcare analytics platform at a radiology practice in the German RheinMain region and the Institute for Radiology at the Swiss Kantonsspital Aarau have demonstrated how this software can improve appointment scheduling and workflows in everyday practice and clinical life while also reducing waiting times and the number of patient no-shows. This delivers considerable service improvement for patients and also reduces costs.

Long waiting times not only cause frustration among patients and referring doctors, but they also pose the risk of delayed diagnosis, meaning that by the time the appointment actually happens, it may be too late to administer the optimum treatment for the illness. “If my next available MRT appointment is not until the next five weeks, for example, I run the risk of losing that patient,” explains Dr. Christopher

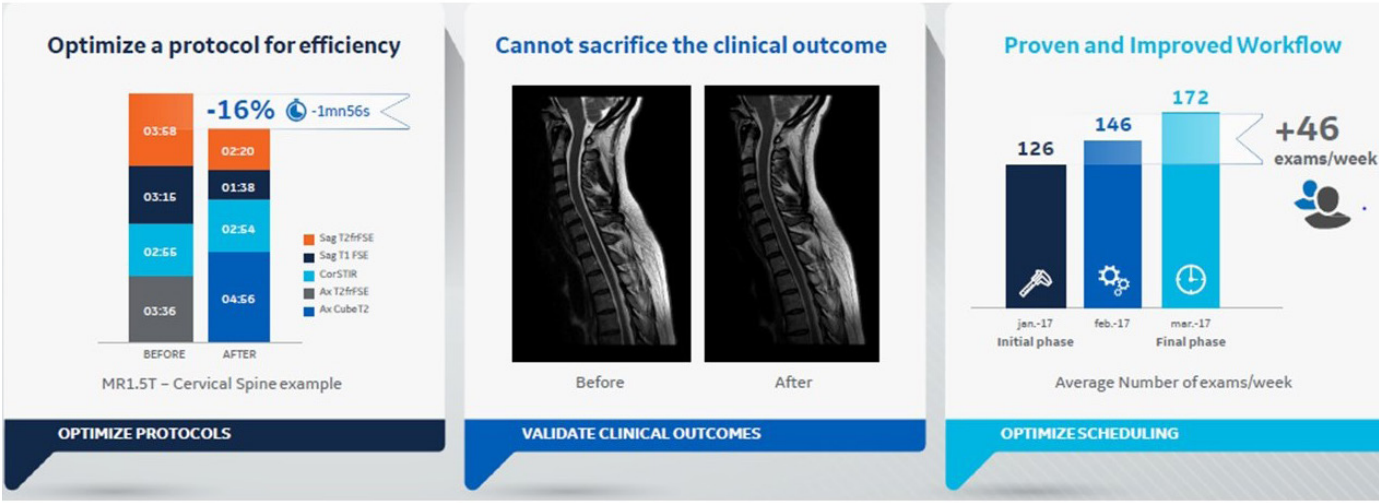


Figure 1: MR Excellence Program

Ahlers, Radiology Consultant and Executive Director of radiomed, a practice cooperative for radiology and nuclear medicine in Germany's RheinMain region. Like many other registered radiologists, Dr. Ahlers is facing many challenges in his daily work. "We need to treat more and more patients in less and less time," explains Dr. Ahlers. The radiologist sees himself as both a doctor and a businessman. "Of course, patient wellbeing is my primary concern, but I also have to pay attention to the efficiency and economic viability of the practice."

Efficient Processes in Medical Practices are Essential

In his quest to remain competitive and to identify improvement potential in everyday practice, Dr. Ahlers looked to GE Healthcare for support. "One stand-out fact was that on some devices, our practice staff were utilized to full capacity with around two patients per hour." From Dr. Ahler's perspective, it, therefore, made sense to address the specific issues with an analytical approach. First, he and his colleagues used a spreadsheet to document all the steps where they were losing time. All unused resources, inefficient scan protocols, downtimes and waiting times cost the practice time and money.

Individual Analysis with GE Healthcare

To ensure the data obtained was of high quality, they embarked on an optimization project together with GE Healthcare. The following questions were defined: Where are we losing time? Does it take too long to reach the point where a patient is actually lying in the scanner? Why are our staff already utilized to capacity with just 1.5 patients per hour? Would it help to employ more staff? Are there idle times?

"No doctor wants unhappy patients," agrees Jan Beger, Director Digital Application Services EMEA at GE Healthcare. This is why GE not only offers continually improving software for imaging equipment but also supplies applications for workflow optimization. "Although this offering is initially pretty invisible compared to an MRT or CT scanner, you suddenly begin to notice improvements in the workflow." Everyone involved wants the process to run smoothly, from registration to examination and then to treatment. "In an ideal scenario, we benefit patients with shorter waiting times, staff with less overtime, and doctors by giving them more time for their patients," is how Beger describes the objectives of the custom AI service supplied for workflow optimization in radiology. To this end, GE has developed an Applied Intelligence platform called Imaging Insights. A set of dynamic dashboards delivers comprehensive analyses from imaging techniques including MR, CT, x-ray and ultrasound. As a cross-provider solution, Imaging Insights combines device data with workflow data from radiology information systems (RIS) to measure key performance indicators (KPIs) in radiology.

Business Intelligence for MR Technology Delivered by MR Excellence

GE´s MR Excellence program, part of Imaging Insights, enables radiology teams to combine the collected data more effectively and to optimize their workflow, increase performance and make informed decisions. The solution uses LEAN and Change Acceleration process tools to assist radiology employees in better understanding their data and making the right decisions. "MR Excellence has finally enabled us to identify the idle capacity times of our MR technology and, therefore, to increase our cost efficiency, while maintaining consistent imaging quality," explains Dr. Ahlers. Through a thorough analytical

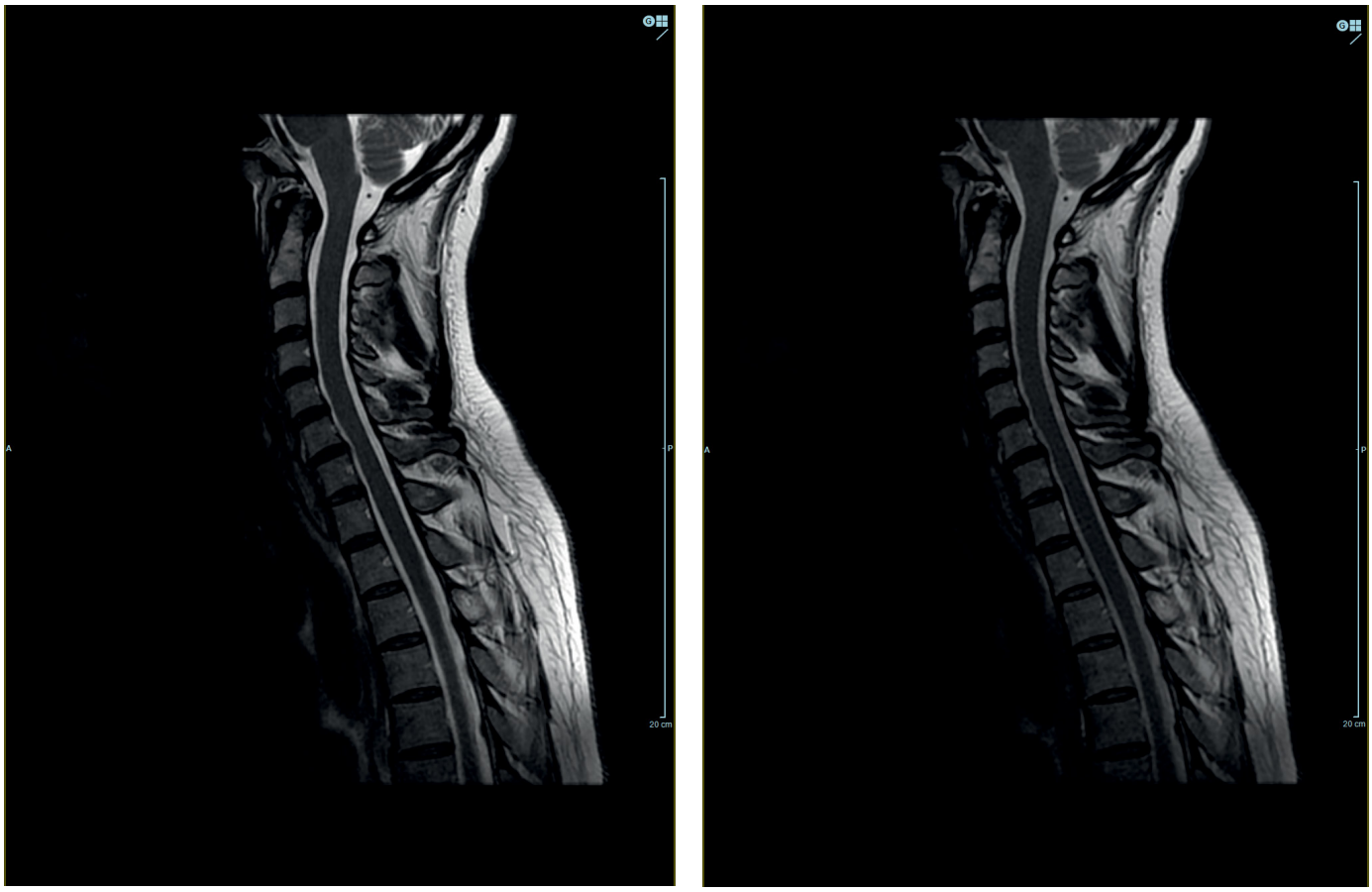


Figure 2,3: 16% time savings with MR 1.5T HWS protocol

investigation of all processes in our clinical practice, MR Excellence has facilitated the optimization and standardization of suboptimal appointment scheduling and resource utilization, as well as scan protocols. Patient waiting times for appointments have fallen from six to eight weeks previously to between one and two weeks, depending on the device. MR Excellence not only optimizes workflows but also applies AI that helps doctors consolidate relevant data.

Dr. Christopher Ahlers is convinced that AI offers benefits for the future of medical care: "Within ten years at most, radiologists will only be viewing images that have previously passed through an algorithm." Rather than replacing doctors, this will provide them with valuable insights that they previously wouldn't have been able to obtain, or at least not so quickly.

Thanks to the use of BI, radiomed has been able to increase productivity by up to 30 percent. Depending on the system, they have been able to increase the number of MR scans from 120 to around 170 a week.

Solutions are Equally Applicable in Individual Practices and Hospital Environments

As the number of patients treated per day increases, the economic benefit becomes more significant. GE Healthcare has solutions that could help achieve this. One example is the Institute for Radiology at the Kantonsspital Aarau, Switzerland: "Here we suggested deploying AI to improve the efficiency of appointment scheduling," explains Beger. So far, initial test runs have shown very positive results. The Institute for Radiology in Aarau employs some 140 employees - of whom 39 are doctors for almost 30,000 inpatients and around 60,000 outpatients every year. In 2018, it performed approximately 120,000 examinations. "Our workflows in the Institute need to be fine-tuned and run like clockwork," reports Prof. Dr. Sebastian Schindera, Chief Physician at the Institute for Radiology, Kantonsspital Aarau, Switzerland. However, the potential for improvement often lies in detail. In 2.5 years, he and his team have documented 2514 no-shows - patients who simply don't turn up for their agreed appointment. The target set by Prof. Schindera, in cooperation with GE Healthcare, is to reduce the number of no-shows. "Ultimately, the increasing numbers of no-shows can endanger other patients who have to wait a long time to be examined."

No Shows are Irritating and Expensive

Whether patients forget, no longer need their appointments,

are running late or have to cancel at the last minute, missed appointments mean more than simply lost revenue. In the worst-case scenario, it also means that booked rooms and devices can't be made available for other patients at short notice. "Since it's not so easy to quickly find another patient for an empty MRT scanner, this results in enormous costs of having equipment standing idle," explains Prof. Schindera. Data published in the USA in 2018 reports a no-show rate of up to 15% in every 200,000 outpatient appointments. According to the study, this can lead to business losses of approximately USD 700,000. Prof. Schindera comments: "I'm not aware of any similar statistics in Europe, but if I project the data from the USA on to our examinations here in Aarau, this will represent losses of up to CHF 150,000 per year.".

Combining AI and Text Message Reminders Minimizes No-Shows

The first step in preventing no-shows is to make a precise record to capture the current situation. A range of strategies can then contribute to decreasing this rate in the hospital. Combining the most effective measures can result in significant improvements. The first solution that was tested in Aarau was sending a text message reminder 24 hours before the appointment. This text message contains key information so that patients remember their appointment or have the opportunity to cancel. If cancelled, the appointment can then be reassigned. In Aarau, this approach reduced the number of missed appointments by 30 to 50%. Although this was certainly an initial success, there was still potential for improvement.

The Aarau hospital, therefore, tried a second strategy, using AI from GE Healthcare, to predict a high no-show probability of patients for a particular appointment. The algorithm is trained using past data and incorporating predictive factors such as day of the week, time of day, weather forecast, demographic patient data and previous history. This algorithm can use patient profiles to generate recommendations, such as "avoid scheduling appointments for patients aged between 20 and 30 early in the morning" or "patients who live more than 20 km away should not be scheduled during rush hour traffic." This AI tool can also provide staff with a list of patients with a "high risk of no-show" for the next five days, so staff can then contact these patients again to confirm the appointment.

Dr. Alexander Cornelius, the Deputy Director of the Institute for Radiology, Kantonsspital Aarau, Switzerland, is delighted with the results of the initial test runs and has a positive view of the complete implementation in just a few weeks: "I'm impressed at the results of the Edison applications from GE Healthcare. The solution has enabled us to estimate the anticipated no-show rates for expensive MRT examinations much more effectively. Using the algorithm should enable us to reduce the number of no-shows and, therefore, fully guarantee high capacity utilization of our equipment infrastructure."

For Beger, this demonstrates the "sheer inexhaustible potential" of AI, which extends far beyond simple appointment scheduling. "It is becoming increasingly rare for diagnosis and treatment to be defined by a single physical location. Nowadays, we can interpret clinical data quickly and accurately and deliver findings directly at the point of treatment." In addition to supporting appointment scheduling, the functionality of "Edison Analytics" also includes more efficient modeling of radiologists' daily workflow. The software provides a general overview of important information such as productivity and throughput times, trend analyses and cost comparisons for reporting findings through to the capacity of individual report writers. "Nowadays, the possibilities of AI mean we can very quickly analyze large datasets from devices and diagnostic imaging processes, in order to obtain answers to decisive questions," is how Beger describes the advantages of the AI and BI solutions from GE Healthcare. This means that clinical and central administrative functions can also be analyzed and optimized across disciplines.

GE is already planning to implement further dashboards offering a variety of additional applications for its Swiss customers. For example, it is currently designing a dashboard that intelligently and independently assigns patients to the appropriate protocol and best possible appointment based on criteria such as referring doctor or specific diagnosis.

GE Healthcare: Data Protection by Design

GE Healthcare is aware that patient data is extremely sensitive: "It goes without saying that our AI solutions are always analyzed in respect of data protection regulations and ethical considerations and are developed accordingly," stresses Beger. "For example, all data used for training AI is anonymized." AI is intended as a support feature to assist medical personnel.

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REFERENCES

1. EBM Reform from April 1. (2020) Available from https://www.kbv.de/media/sp/EBM_Reform__bersicht_Fachgruppen.pdf