

# AI: Opportunities, Capabilities and Limits

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# Application of Artificial Intelligence in Healthcare

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Artificial Intelligence is believed to lead the process of digitalisation and transformation in healthcare. How can healthcare organisations prepare for this change? What opportunities does AI offer for the healthcare sector? Which AI-based radiology tools are expected to make a difference? HealthManagement.org spoke to Sourabh Pagaria, Executive Vice President & Managing Director of the Southern European business of Siemens Healthineers to get some insight on these important questions.

## What, in your opinion, is the true value of digitalisation in healthcare?

The role of digitalisation as a game-changer in the healthcare world was clear since the outbreak of COVID-19. It is the key enabler in providing high-value patient care. But in the course of these two years, we have also understood that digitalising healthcare in a sustainable way goes beyond adopting new tools and technologies. It requires a cultural change and a re-alignment of organisations around data-driven digitally-enabled processes and care models. Simply digitalising current processes and procedures is not enough. With this said, in my opinion, the true value of digitalisation can be broken down into the following elements: increasing efficiency, expanding access to care, improving clinical outcomes and accelerating innovation cycles. For instance, home-based telemedicine or teleconsultation can reduce care costs in several chronic conditions. Teleradiology can give remote locations and standalone imaging clinics access to teaching hospital quality care, and allow clinicians to collaborate and share information productively in virtual spaces. Digitalisation can help connect caregivers and patients for better coordination and knowledge sharing while strengthening integrated care across the health systems.

## What specific opportunities do you see with respect to the application of medical AI technology in healthcare?

In the future of healthcare, Artificial Intelligence (AI) will be indispensable for translating the growing volumes of data into decision-relevant knowledge. In general, digitalisation, data and artificial intelligence are key for scaling the application of technical advances as AI-enabled tools identify meaningful relationships in raw data, extract relevant insights, and apply those lessons to new patient cases. For example, during the

COVID-19 outbreak, it was essential to identify as quickly as possible if a specific patient was suffering from COVID-19 pneumonia or if the pneumonia had a different cause. This is what the rapid AI-based algorithm Siemens Healthineers developed does by automatically quantifying air space opacities associated with COVID-19 pneumonia. To sum up, whenever analyses are too difficult, time-consuming, or inefficient to perform alone, AI provides valuable assistance to clinical professionals, allowing them to stay focused on their patients and better use their own expertise. AI can help bridge the gap between the demands of ever-increasing, extremely complex data and the number of radiologists to simplify data interpretation through sophisticated AI algorithms, thereby improving the diagnostic process. Moreover, AI-powered clinical decision support systems could help free up precious physician and specialist time which could then be used by them to provide more emphatic and personalised care to the patients as comprehensively and productively as possible.

## AI is expected to lead the process of transformation in healthcare. What good practices do healthcare organisations need to adopt to better prepare for this?

Healthcare organisations should shift towards building a digital enterprise with a clear commitment to managing data as a strategic asset. Healthy systems have to integrate data from multiple sources on secure and easily accessible data platforms.

In our view, there are four steps to be taken to create smart data management:

1. Set data strategy and establish governance
2. Capture data securely and automatically
3. Validate data via automated clean-up
4. Connect data via secure, accessible platforms and EHRs



These four steps will result in reliable and secure data that, together with advanced modelling and AI, empowers data-driven decisions within a health system – be it in the clinical, operational space, or directly helping consumers make the right decision in their care.

sources (e.g., pathology, lab, genetics, imaging) to best navigate and stratify patients for their personalised therapy. We cannot predict the future, but we can prepare for a future that is increasingly unpredictable with the tools we already have. For example, AI algorithms enable automated detection

## With AI-assisted image analysis and triaging algorithms improving by the day, radiology, as we traditionally know it, will have a very different and pivotal role to play in the future

### **For effective application of AI in healthcare, there needs to be a clear definition of automatised diagnosis. What do you think this entails?**

One of the most pressing concerns in radiology today is the exponential growth of data and the shortage of medical staff to handle the complex and ever-increasing amounts of information. The important base material for AI-powered “outcomes” is an important “connector”- individual electronic health records (EHR) that help aggregate patient histories with in-vitro, in-vivo, genomics information, lab data and much more. With patient permission and understanding, AI-powered technology will take this vast amount of data and transform it into actionable insights. This AI-assisted technology generally has been dubbed the diagnostic decision support system (DDSS), and [surveys have shown](#) it could improve diagnostic accuracy by nearly 9%. Significant gains have especially been reported in recent years, for instance, in AI-assisted cardiac risk assessment. AI can cull through hundreds of thousands of cases to calculate where a heart patient fits into a risk stratification to inform cardiologists’ decision-making. AI algorithms must be properly trained. Our Siemens Healthineers’ Artificial Intelligence is based on algorithms trained with an extensive amount of curated data. I’m talking about [more than 1.4 billion entries](#), and we run more than 1,200 AI experiments a day on our supercomputer and today, we have more than 800 patent families related to artificial intelligence.

### **Which next-generation AI-based radiology tools do you foresee in the future?**

The radiology community is largely coming to terms with the fact that AI is not a threat but rather a tool that helps them become more precise, effective and efficient. Nowadays, AI is already playing a transformative role. In the long term, with AI-assisted image analysis and triaging algorithms improving by the day, radiology, as we traditionally know it, will have a very different and pivotal role to play in the future where it will help to centre and integrate data from various

of anatomical structures, intelligent image registration and reformatting. Abnormalities and segment anatomies are automatically highlighted, and results are compared to reference values in order to increase precision and speed up the workflow. These efficiency gains will become increasingly important given the growing demand for diagnostic imaging and rising cost pressure.

### **Can AI also address the impact of staff shortages and access to qualified clinicians in remote areas?**

Healthcare, like much of the rest of the economy, is facing a labour shortage. AI can lighten the load for overworked providers through everything from automation to triaging patients. It has the potential to significantly improve access to high-quality healthcare and also improve diagnosis and therapies. Not only in highly specialised centres but also in remote, poorly populated areas and emerging countries. It can automate repetitive tasks, allowing healthcare providers to focus on higher-level cognitive tasks and patient care. Through digital technology, it is possible for clinicians to provide care at a distance. Some specialties, including radiology and pathology, have already adopted technology to enable consultations from a distance. With radiologists in short supply, teleradiology brings continuous radiology coverage to even smaller or remote locations, allowing more patients to benefit from specialist care.

### **There have been numerous problems with EHRs. Do you think AI could address some of these issues and make EHRs more efficient and easy to use?**

Health systems struggle with fragmented systems of care, and interoperability between hospital and primary care physicians’ data is often lacking. As a result, information during care transactions can be lost, and patient data is not fully leveraged when developing care plans. Here the concept of “moving information, not patient” should be embraced by healthcare institutions, shifting toward that digital enterprise model where data



are collected and connected to secure and easily accessible data platforms from segmented sources. Clinicians will be able to collaborate and share information productively, reducing information loss during care transitions.

**AI has potential in healthcare. However, are there any limitations that need to be kept in mind?**

What needs to be understood is that change and transformational speed in healthcare institutions isn't the same as in other industries (e.g. consumer-related industries). Healthcare

is a heavily regulated environment; the demands are rigorous and very specific. Moreover, the regulations can differ from country to country. As much as hospitals and clinics may be keen on using AI technologies for informed decision-making, these technologies must always be validated in clinical studies. By doing so, healthcare institutions gain a solid understanding of what the transformation will be and if it will do good for the patient, ultimately leading the patient to a better situation. Digitalisation in healthcare is the key enabler in providing high-value patient care. ■

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