Access to care

Focus on regions with less developed medical infrastructures

medneo's success story with mobile MRI systems and remote scanning

SIEMENS Healthineers

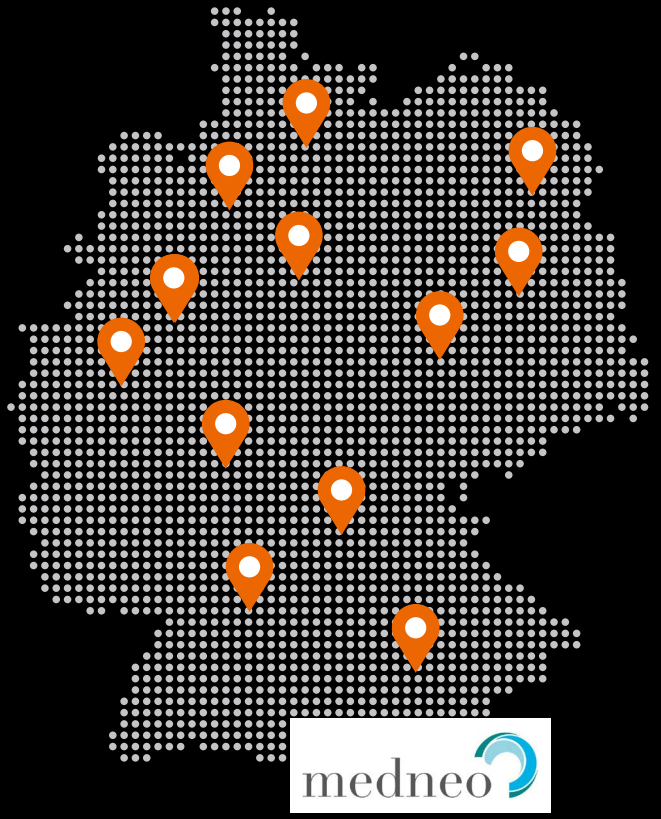
About the customer

medneo

The German networking partner for radiology, medneo GmbH, operates

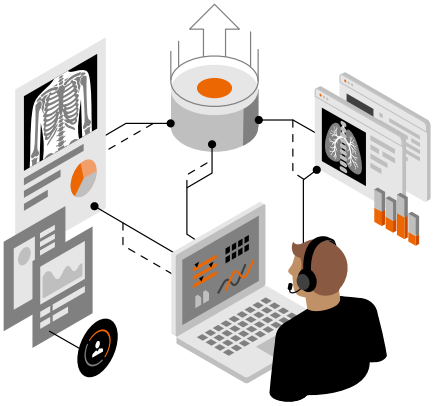
- **16 diagnostic centers in Germany**
- **with 17 of their MRI scanners connected to *syngo* Virtual Cockpit**

medneo offers medical specialists and other physicians flexible access to MRI and CT systems across their network.



syngo Virtual Cockpit

syngo Virtual Cockpit is Siemens Healthineers' multi-vendor remote scanning software. With *syngo* Virtual Cockpit, transform care delivery and achieve a higher level of standardization and diagnostic consistency. By enabling virtual access to experts, *syngo* Virtual Cockpit allows care teams to increase productivity and provide the highest quality of care in all locations.



Introduction

"The shortage of skilled workers in key positions within the medical system is a threat to healthcare in Germany."

Marcus Schmidt,
CEO medneo

In 2019, the German Association of Academic Medical Centres (VUD), in cooperation with the German Association of Medical Faculties (MFT), reformed the healthcare structures serving rural areas. This reform focused expressly on increased development of digital networks and telemedicine with the aim of providing extensive coverage to large areas. [1]

Demographic change is producing an aging population, resulting in fewer practicing physicians as more and more reach retirement age. This effect is particularly pronounced in regions with less developed infrastructures. By 2035, there are projected to be 11,000 vacant positions for general practitioners, and nearly 40 percent of districts will be underserved. Even today, specialist physicians are scarce in rural regions, and patients must face extensive travel and long waiting times to receive an appointment. [2]

This impacts specialist fields such as radiology in particular because purchasing diagnostic devices for these fields requires significant investments. These investments, in turn, require long periods to recoup when the devices are used at low capacity. This report illustrates how innovative solutions such as remote scanning and the use of mobile MRI systems can lessen the impact of the shortage of skilled workers within diagnostic imaging while safeguarding healthcare services in regions with less developed medical infrastructures. The focus here is on the potential of telemedicine and remote scanning.

[1] DHM_Regionale Verantwortung der Unimedizin_final https://www.uniklinika.de/fileadmin/user_upload/D HM_Regionale_Verantwortung_der_Unimedizin_final_.pdf (Accessed on: 28 October 2023, 15:25).

[2] Pressemeldung: 2035 fehlen in Deutschland rund 11.000 Hausärzte – Experten empfehlen den Aufbau von Gesundheitszentren https://www.boschstiftung.de/de/presse/2021/05/2035-fehlendeutschland-rund-11000-hausaerzte-expertenempfehlen-den-aufbau-von (Accessed on: 28 October 2023, 15:30).

Perspectives

In the following section, we examine different perspectives and the ways in which they illustrate the benefits of mobile MRI technology and remote scanning.

"It's amazing how medicine and technology are brought directly to the patients. [...]" [3]

Martina H.
on the HerzCheck Project

Patients

Patients benefit significantly from the opportunity to undergo MRI exams in mobile MRI systems near to where they live. For older and frail patients in particular, this option spares them the less stress and discomfort from long journeys to and from the exam. Increased MRI density and the subsequent decrease in waiting times lead to faster diagnoses. This is often a decisive factor in understanding disease progression and enabling the prompt onset of treatment. In addition to improving prescribed exams, this technology also presents significant advantages for preventative care. Barriers to preventative examinations are lowered when facilities are available and easily accessible. medneo's service portfolio, which provides both radiologists and specialists in fields such as cardiology, orthopedics, and neurology with access to radiological services, dramatically improves patient care. This means that, thanks to mobile MRI systems, patients can continue to visit their own physicians. Furthermore, they can consult with other specialists anywhere in Germany, if needed.

*[3] HerzCheck.org, Unsere Patient*innen Nummer 3.000 und 3.001. [Online] Available at: https://www.herzcheck.org/3000-patient/ (Accessed on: 7 November 2023, 17:30).*

Perspectives

"Thanks to RAAS, I am free to concentrate solely on my work as a physician."

Henning Steen, MD
Head of Cardiac Imaging, medneo

Specialist physicians

From the perspective of specialist physicians, mobile MRI systems, together with medneo's Radiology-as-a-Service (RAAS), present a valuable advantage by improving access to imaging diagnostic technology and services in regions that are underserved by medical professionals. Although there are enough specialist physicians in Germany as a whole, uneven distribution is a persistent problem. Thanks to mobile MRI systems, specialist physicians in underserved areas can offer their patients radiological services and access to high-quality imaging diagnostic services without relying on referrals to radiologists in other regions, which can be taxing for patients.

In addition to providing onsite services by specialist physicians, medneo also allows specialists to carry out noncontrast examinations via telemedicine and thereby supervise examinations from any location. This has the potential to dramatically increase practice efficiency, because the practicing physician does not have to be present onsite. medneo's services allow practices to utilize cutting-edge MRI technologies without the capital investment of purchasing diagnostic devices themselves. The time it takes to amortize these types of medical systems depends on utilization rates, which tend to be lower in regions with lower populations. This challenge can be avoided by using mobile MRI systems and rotating sites so that specialist physicians can provide their patients with more efficient care. RAAS is not simply more efficient, however; it is also more comprehensive, as it allows specialist physicians to diversity their service portfolios. By taking advantage of medneo's services, practices and clinics can provide a wider range of diagnostic services and improve their standing among patients.

In addition, RAAS also allows specialist physicians to seek second opinions from first-class experts within the medneo network. This can be a key advantage, particularly in complex cases or when handling rare conditions, in that it allows for more precise diagnoses and treatment planning.

Perspectives

"Having the opportunity to work remotely allowed me to switch from part-time to full-time, because I didn't have to commute two hours to work anymore."

Melanie Di Leo
Remote radiology technologist,
medneo

Staff

From the perspective of staff, in particular radiology technologists, using remote scanning to provide essential services is a key and tangible step to combating the current shortage of specialists in the medical field.

One of the major changes involved in remote scanning is how the technology overcomes geographical limitations. Radiology technologists no longer have to be physically present at the MRI scanner. They can work from any location, provided that the necessary remote hardware and software is installed and that there is a reliable internet connection. Thanks to remote scanning, radiology technologists are better able to balance work with individual needs and lifestyles, for instance, by returning to work sooner than expected—or returning at all—following parental leave.

Many skilled workers cannot accept part-time jobs due to shift scheduling and long-distance commutes. Ultimately, that robs the medical field of valuable specialists. Remote scanning offers flexible onboarding options for part-time workers and those returning to the workforce following interruptions or parental leave.

It is no longer strictly necessary for skilled workers to be present on location. Remote scanning also helps overcome bottlenecks **in regions with less developed medical infrastructures and allows clinics and practices to provide radiological services, even in rural areas.** In summary, the introduction of remote scanning provides radiology technologists with more flexibility, allowing them to balance work and family while helping to safeguard patient access to radiological services in regions with shortages of skilled staff. This development is a significant step that benefits both skilled workers and patients.

Perspectives

"Thanks to remote scanning, we were able to compensate easily for staff shortages and safeguard patient care."

Daniel Sievritts,
CTO medneo

Entrepreneurial perspective

The integration of remote scanning and mobile MRI technology provides extensive economic benefits for the healthcare sector. In Germany, as in many other countries, there is a considerable shortage of skilled workers in the field of radiology. **Radiology technologists are often in short supply, and this has a significant impact on the efficiency of patient care.** Even when there are enough devices available, exams are often canceled or not scheduled at all due to a lack of available staff.

Remote scanning optimizes utilization of MRI systems, increasing returns and justifying investments in purchasing and maintenance. By 2023, medneo secured over 1.5 million euros in turnover that would otherwise have been cancelled or deferred due to staff shortages.

Thanks to mobile MRI services, the necessary resources can be invested in different regions, especially those with less developed medical infrastructures, and new markets can be explored. Having the flexibility to respond to shifts in demand improves economic efficiency. Hospitals and healthcare facilities can employ RAAS as needed to optimize their utilization and reduce overcapacity by extending service hours. The scalability of the business model makes it possible to adjust offerings based on demand and expand as necessary in order to gain a competitive advantage.

In summary, remote scanning and the use of mobile MRI systems improve resource distribution by increasing flexibility, expanding service portfolios, and improving competitiveness, thereby boosting company profitability while maintaining the delivery of high-quality medical care to patients.

medneo – status quo

Continuous development of new technologies and innovative approaches improves access to medical care and public health improves as a result. medneo GmbH, a German company in the field of medical imaging and diagnostics, established itself as a leader in the implementation of new approaches to radiological healthcare over the past several years. Two of medneo's central concepts, aside from Radiology-as-a-Service, are the mobile MRI trailer and the introduction of remote scanning. In 2018, medneo commissioned a fleet of three mobile MRI trailers. One of medneo's trailblazing initiatives was its participation in the HerzCheck Project, which was funded by the German Innovation Fund of the Federal Joint Committee (G-BA). The aim of the project was early detection of asymptomatic heart failure with the goal of initiating treatment for affected patients living in regions of the German states of Brandenburg and Mecklenburg-Vorpommern with less developed medical infrastructures. In cooperation with consortium partners such as the German Heart Center at the Charité university hospital in Berlin, insurance provider AOK Nordost, and three academic medical centers, medneo helped provide examinations to over 5,000 patients in two mobile MRI trailers at 12 locations over a period of two years. At the same time, medneo developed nationwide projects to diagnose early-stage cardiac diseases in cooperation with cardiologists and other experts. In January 2023, medneo introduced remote scanning, a new milestone in medical imaging. This step involved equipping all sites, a total of 17 MRI systems, with the ***syngo* Virtual Cockpit solution from Siemens Healthineers.**

The three MRI trailers are currently operating a system developed by medneo, but the solution from Siemens Healthineers will be installed in the near future. In addition to implementing the hardware and software, medneo also established a team that currently includes eight remote scanning radiology technologists. This team is spread out across Germany and supervises all medneo facilities from their local workplace. Remote scanning was originally introduced as a support measure for staff who were sick or on holiday and to compensate for vacancies on radiology teams.

medneo – status quo

medneo reports a reduction of default rate (e.g. appointment cancellations because of staff shortage) from 8% in 2022 to 0,3% in 2023. The remote team continues to expand, and thanks to the growing expertise of the remote radiology technologists, **medneo increased the number of remote exams performed to over 1,000 per month.** medneo is now planning its next step, which is to adjust the shift schedules for the individual sites so that remote scanning can be integrated as a standard part of the staff's daily routines.

The goal is to perform over 30 percent of exams remotely in the near future. This would dramatically boost efficiency because, thanks to internal training and increased experience, radiology technologists could perform multiple examinations simultaneously. Marcus Schmidt, CEO of medneo, defined five new developmental levels for radiology.

The graphic on the next page illustrates this development from traditional radiology to cutting-edge solutions. medneo is the first and only solution provider to have reached level five from a technological standpoint, and the company has already integrated these techniques in its daily operations. medneo is always cognizant of the legal and moral obligations and responsibilities of its work, including the obligation for a physician to be present onsite when exams involve the use of contrast agents or stress testing. The company also complies strictly with all requirements regarding the medical qualifications of onsite staff involved in remote examination procedures.

This commitment demonstrates that medneo focuses on more than just technological innovation. Indeed, the company is also dedicated to upholding medical quality and ethical standards to the fullest in the implementation of these concepts. medneo's flexibility regarding the different development levels and its adherence to the highest standards of quality make it a leader in the field of modern diagnostic imaging.

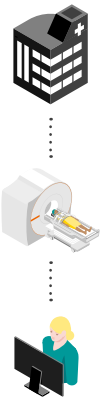
From traditional radiology to cutting-edge solutions

Level 0 – Traditional radiology

This is the typical concept: A radiology practice owns a device that is installed onsite. Radiologists and radiology technologists are present onsite to perform the exams.

Level 1 – Mobile radiology

At this level, mobile MRI systems are transported to different areas to perform exams in rural regions or regions with less developed medical infrastructures. Both radiology technologies and radiologists/specialist physicians travel along with the devices to deliver high-quality diagnostics.



Level 2 – Diagnostic center without onsite physician

At this level, there is a radiological diagnostic center that is also open for use by specialist physicians. For noncontrast exams, physicians are not required to be present onsite; patient consultation and discussion of results take place remotely.

Level 3 – Diagnostic center without onsite physician or radiology technologists

At this level, radiology technologists control the MRI device remotely. Medical staff, such as physicians' assistants (PA), perform the exam. For noncontrast exams, physicians are not required to be present onsite; patient consultation and discussion of results take place remotely.

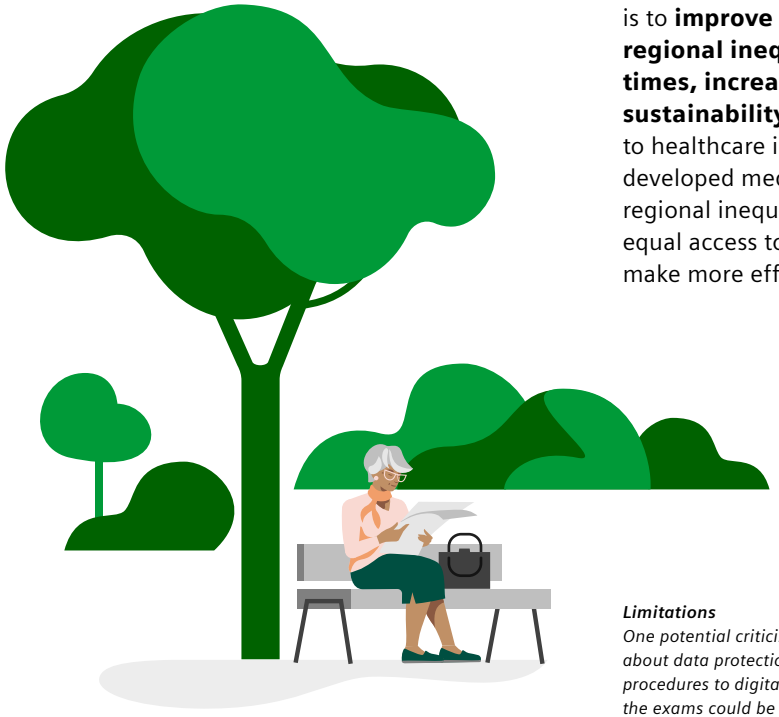
Level 4 – Mobile radiology without onsite physician

This level includes the use of a mobile MRI device without the presence of radiologists/specialist physicians onsite. Physicians supervise the procedure via telemedicine.

Level 5 – Mobile without onsite physician or radiology technologist

At this level, mobile MRI systems are operated without an onsite radiologist or radiology technologist. Exams are supervised by medical staff, e.g., PAs, and the device is operated remotely by a radiology technologist. Physicians supervise the procedure via telemedicine.

Perspectives



Societal perspective

The integration of remote scanning and mobile MRI technology in diagnostic imaging is poised to have a profound impact on society. Ultimately, the aim is to **improve access to healthcare, minimize regional inequality, shorten patient waiting times, increase efficiency, and promote both sustainability and profitability.** Improving access to healthcare in rural regions and regions with less developed medical infrastructures while reducing regional inequality promotes social justice and equal access to healthcare. Medical facilities can make more efficient use of staff and technological resources without having to invest in purchasing expensive MRI systems or attempting to combat the shortage in skilled workers single-handedly. Remote scanning is fundamentally changing how radiology technologists work and ushering in a range of new opportunities that dramatically improve the appeal of the career path. The introduction of new technologies and services, such as mobile MRI services and remote scanning could increase the number of jobs available in medical facilities and in the healthcare sector as a whole. This not only improves economic stability; it also modernizes the healthcare sector.

Limitations

One potential criticism of the concept described above involves concerns about data protection associated with shifting medical diagnostic procedures to digital platforms. There is also a risk that the quality of the exams could be compromised if they are not performed by qualified specialists present onsite. Although technology is improving access to medical services in many cases, social and economic disparities may cause continued movement of medical staff away from rural regions and regions with less developed medical infrastructures. This could have a long-term impact on the job market for radiology technologists. These potential concerns underscore the need for critical assessment of the concept with respect to data protection, quality, and ethical considerations. medneo has completed this assessment and implemented strict standards for both data protection and quality assurance. Future impacts on the job market must be weighed up against the need to safeguard patient access to care, particularly considering the aging population. The development of Internet infrastructure must be viewed as a limiting factor. Fast fiber-optic connections are the ideal solution for enabling smooth and secure data transmission. Unfortunately, this technology is often too slow to spread to rural regions to meet necessary requirements.

syngo Virtual Cockpit is not commercially available in all countries. Future availability cannot be guaranteed. Technical and organizational preconditions need to be ensured before using *syngo* Virtual Cockpit. Please contact your local Siemens Healthineers organization for further details.

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