White Paper: recommendations for ensuring high-quality implementation of remote MRI scanning

1. Introduction

Magnetic resonance imaging (MRI) is crucially important in radiological diagnostic imaging. This is due to its ability to provide high soft tissue contrast and excellent spatial resolution. These properties make MRI an extremely valuable tool for a variety of medical issues. Due to its superior diagnostic power, MRI is often considered a reference standard. (Hunold, Sandstede, & Bucher, 2021)

According to the Federal Office for Radiation Protection (BfS), around 13 million MRI scans were carried out in Germany in 2023 (Federal Office for Radiation Protection (BfS), 2023), 1.09 million MRI scans were performed in Austria in 2019 (Wachabauer, Röthlin, & Mathis-Edenhofer, 2022), and 1.06 million MRI scans were carried out in Switzerland in 2019 (Swiss Federal Statistical Office (FSO), 2021).

Recent technological advances in radiology have created the opportunity to introduce remote scanning roles in radiology departments. These allow staff to access, observe, and even scan remotely without being at the device in person. The COVID-19 pandemic has accelerated the use of remote work, which is also consistent with the general developments in health care. (Hudson & Sahibbil, 2022)

All well-known medical device manufacturers already offer remote solutions for their scanners and advertise them as a solution to the shortage of skilled workers, while at the same time ensuring highly flexible work opportunities for radiographers[1, 2, 3], along with increased efficiency and productivity.

The following definition is used in this text:

"Remote scanning" – performing scans via remote control.

As distinct from:

"Remote support" – support for and training of skilled staff by experts at the workplace.

The professional associations in Germany (DVTA), Switzerland (SVMTR), and Austria (rtaustria) all recognize the potential of remote scanning and welcome

[1] **Germany:** Medical radiology technician
[2] **Austria:** Radiology technician
[3] **Switzerland:** Graduate radiographer

constructive developments at the national and international level, involving all relevant health care professions.

In modern health care, it is crucial to create **optimal framework conditions** for the examination of patients. Remote MRI scanning provides a way to safely screen patients by having qualified professionals perform imaging remotely. This white paper from the professional associations of radiographers[1, 2, 3] in the DACH region (DVTA, rtaustria, and SVMTR) presents a comprehensive range of framework conditions, taking into account the safety of patients and health care professionals, as well as ensuring quality.

2. Framework conditions

Continuing education and training:

- Appropriate training and further education of radiographers[1, 2, 3] in the context of remote scanning, as well as introductory training on the remote scanning procedure (incl. data protection and IT security). Recommendation: at least 3 years of professional experience in MRI cross-sectional diagnostic imaging
- Ongoing training is necessary. Radiographers[1, 2, 3] have an ethical obligation to continually educate themselves to keep their knowledge of new technologies, protocols, and safety guidelines up to date.

Number of patients to be scanned at the same time:

- Recommendation: Perform **only one scan per person** simultaneously to ensure patient safety and examination quality.

Working time and break regulations:

- Compulsory observance of the statutory provisions on working hours, breaks, and rest periods and, where applicable, regulations on computer workstations.

Work environment and ergonomics:

- Compliance with current standards for ergonomics and workplaces
- Ensure a distraction-free environment. Recommendation: separate work room and appropriate room climate
- Compliance with technically relevant requirements for image analysis and working environment, such as a workstation with a powerful computer, high-resolution monitor with approved brightness, and adapted

[1] **Germany:** Medical radiology technician
[2] **Austria:** Radiology technician
[3] **Switzerland:** Graduate radiographer

room lighting. The requirements do not differ from those that apply to a conventional radiology workplace.

Remote scanning from an EU/EFTA country:

- Contractual regulations on remote scanning must be established between the contracting parties before commencing work.
- ***Urgent recommendation***: Radiographers[1, 2, 3] (as contractors) should inform themselves about the respective legal requirements in the country where the remote scanning is being performed and comply with them. The same applies to employers.

Technical infrastructure, data protection, and cybersecurity:

- Regular maintenance schedule for the remote scanning infrastructure to ensure proper functioning and immediate troubleshooting by trained service technicians.
- Provision of the necessary infrastructure for remote scanning (such as computers, monitors, data cables, license costs, etc.), as well as pro rata coverage of the costs of the internet connection, energy costs, etc.
- Fulfillment of minimum criteria, such as operating the MRI console and simultaneously observing the patient (high transmission quality) throughout the entire examination process, monitoring the injection data (coupling of the CM injector) and viewing the injection site (or ensuring on-site monitoring), access to patient data (patient file, vital signs, etc.), as well as a secured communication structure with patients and staff.
- No use of personal hardware or software components to ensure IT and cybersecurity, as well as regular necessary updating of components.
- The device used must comply with current security standards and be constantly updated.
- It is imperative to have a contingency plan in case of interrupted transmission of the remote scanning and to train on-site staff on this plan in order to ensure patient safety.

Staff and emergency management

- The usual team structures for collaboration (communication, etc.) apply, in particular for emergency situations and in the event of an incident (e.g. work instructions for relevant emergency procedures)

[1] **Germany:** Medical radiology technician
[2] **Austria:** Radiology technician
[3] **Switzerland:** Graduate radiographer

- On site: Radiographers[1, 2, 3] or sufficiently technically qualified staff (compliance with the respective legal requirements) to carry out, for example, the positioning of the patients and the application of the contrast medium

Necessary checks throughout the examination process

- Check whether patient information is available and documented
- Inform the patients about the remote scanning procedure before performing the examination
- Inform the person performing the remote scanning about relevant MRI safety factors such as implants, tattoos, etc.
- Close involvement of the persons who are technically performing the remote scanning in the examination process at the clinic or practice (compliance with standards, etc.).
- Compliance with legal requirements at the site where the MRI scan is performed (the site means in the country where the patient is in the MRI machine)
- Adherence to the responsibility of radiographers[1, 2, 3] for their own actions (concerns: possible legal consequences for radiographers[1], [2], [3], etc.)

3. Conclusion

This white paper provides comprehensive recommendations for ensuring high-quality implementation of remote MRI scanning. Taking into account the framework conditions listed above can ensure an effective and safe implementation of remote scanning in health care facilities, in particular the quality parameters for patient safety and care.

The focus of remote scanning must be on ensuring and maintaining patient care. Economic considerations (such as saving on staff cost, etc.) should be subordinate, ensuring that remote scanning takes place within a regulated framework and that the focus is on the patients.

11 April, 2024

Claudia Rössing B.A.	Sabine Weissensteiner M.A.	Marco Budin
Chairperson of Radiologie und Funktionsdiagnostik DVTA e.V.	Chairperson of rtaustria	Chairperson of SVMTR/ASTRM

[1] **Germany:** Medical radiology technician
[2] **Austria:** Radiology technician
[3] **Switzerland:** Graduate radiographer

Bibliography

Swiss Federal Statistical Office (FSO). (2021). *Medizintechnische Ausstattung von Spitälern und Arztpraxen im Jahr 2019.* CH Neuchâtel. Retrieved on 30 March, 2024, from https://www.bfs.admin.ch/asset/de/16584129

Federal Office for Radiation Protection (BfS). (2023). *Magnet-Resonanz-Tomographie*. Retrieved on 31 March, 2024, from https://www.bfs.de/DE/themen/ion/anwendung-medizin/diagnostik/alternativ/mrt.html

Hudson, D., & Sahibbil, J. (28 August, 2022). Remote scanning support in magnetic resonance imaging: Friend or foe? *Radiography,* 739-745. doi:10.1016/j.radi.2022.03.010

Hunold, P., Sandstede, J., & Bucher, A. (2021). Statement of the German Roentgen Society, German Society of Neuroradiology, and Society of German-speaking Pediatric Radiologists on Requirements for the Performance and Reporting of MR Imaging Examinations Outside of Radiology. *Fortschr Röntgenstr*., DOI 10.1055/a-1463-3626.

Wachabauer, D., Röthlin, F., & Mathis-Edenhofer, S. (2022). *Häufigkeit medizinischer Anwendungen ionisierender Strahlung und Abschätzung der Bevölkerungsdosis für Österreich.* Gesundheit Österreich, Vienna. Retrieved on 30 March, 2024, from https://jasmin.goeg.at/id/eprint/2323