

Guiding principles for departments implementing virtual support technology (VST) in Computed Tomography (CT) and Magnetic Resonance Imaging (MRI)

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Introduction

The Society of Radiographers (SoR) recognises the growing interest in the application of virtual support technology (VST), also known as remote operation, within diagnostic Computed Tomography (CT) and Magnetic Resonance Imaging (MRI).

This document intends to support departments in the implementation and use of this technology.

This Guidance should be read in conjunction with the SoR position statement ¹ on the use of VST in CT and MRI. When considering implementation, the use of virtual support tools or remote operation technology should enhance staff training, patient safety, patient experience, image quality, and radiation dose management.

The SoR does not support using this technology as a replacement for employing sufficient adequately trained and experienced radiography staff.

High level organisational agreement (board level) and Information Technology (IT) buy in is essential prior to implementation of this technology to ensure effective multi stakeholder working. The advice of a medical physics expert (MPE) and, in the case of CT, a radiation protection advisor (RPA) should be sought at the outset.

Systems should be in place to ensure ongoing effective provision of professional supervision i.e. formative, normative, and restorative interactions and the identification of continual professional learning and development needs.

All staff should be aware of the process for safe and appropriate scheduling of patients, be appropriately trained, and have sufficient knowledge and experience to conduct this process effectively.

At service level, a thorough analysis of need should be undertaken to inform the business case. This should consider:

1. The need for this technology

- What the service improvement aims are (organisational and patient facing) and how they will be measured against the Quality Standard for Imaging (QSI) ²

1. Position statement on the use of VST in CT and MRI. The society of Radiographers 2025
2. [Quality Standard for Imaging](#).

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- How the technology will improve training and development of staff and learners

2. The impact on patients, service users, and staff

- The importance of engaging with patients and staff to understand how the technology will best meet their needs
- How roles, responsibilities and lines of accountability are established
- How the standard operating procedures ensure patient safety requirements can be met by the on-site and remote operators during the scan
- How staff can input to the design and continual improvement of the service
- How patients can input to service design, delivery, and improvement
- How the organisation will identify radiographers suitably skilled and experienced to act as remote supervisors i.e. hub operators
- What measures are in place to ensure reliable network connection is maintained between the hub and site, including the patient, in case of technology failure
- How lines of communication are maintained between the on-site operator, the patient, and the remote hub. This must include systems to maintain continual visual and verbal communication between the operator and the patient.
- How the organisation assesses the hub operator requirements and ability to multitask
- How remote operators will maintain effective professional supervision relationships from the hub with on-site staff
- How remote operators will know the level of skill and practical experience of the on-site operator
- How employers will co-operate regarding written procedures where required
- How outcomes and benefits for patients, service users and staff will be measured
- How clinical evaluation provision will keep pace with additional scanning capacity to avoid increasing the wait for patients to receive results
- Physical requirements for siting of remote hub (home working or located within organisation facility)
- The specific training and assessment requirements for the competent use of the remote hub
- The need for a review of staffing levels and skill mix
- How standard operating procedures are aligned between the site and the remote hub
- How co-operation between employers is assured where appropriate

3. Governance and service design

- Cost analyses supporting use of the technology
- How risk assessments of hub and spoke sites are conducted
- Contingency plans for loss of remote connectivity
- Clearly defined operator training requirements and competency assessments
- Clearly defined employer's procedures
- Clearly defined standard operating procedures for each hub and scan site
- Clearly defined medicines management mechanisms as applicable to CT and MRI
- Clearly defined co-operation agreements between employers
- Clear delegation and supervision framework
- Systems to manage patient information/data security and transfer protocols
- Clearly defined audit procedures and action plans
- Quality control roles and responsibilities
- Procedures for managing emergencies
- Process for investigating errors and near misses
- Contingency plans for network connection/loss of remote hub
- Data and Cyber security assurances for the organisation, staff, and patients
- Adherence with principles of successful change management
- Consider thorough pre implementation testing to assure adequate network speed and a high level of uptime reliability
- Suitably qualified and sufficient project management and staff management expertise and resources
- Inhouse IT involvement at the outset with a commitment to ongoing support and infrastructure
- Inclusion of a pilot or trial period and review prior to full implementation

4. Consent

- To gain valid informed consent from an individual undergoing an MRI or CT scan they must be provided with adequate information to be able to assess the benefit and risks of the procedure.
- The individual should be informed that VST is in operation and understand how the safety of their scan is assured.

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- The individual must be informed if there is visual access from the remote hub and consent sought
 - The individual must be assured of their confidentiality and safe use of data and images
 - The individual must be able to reach their decision without detriment or undue pressure and should be supported to understand in a way that is appropriate to them.

MRI specific considerations

The strong static magnetic field, time varying magnetic fields and radio frequency fields used in MRI pose some unique safety considerations that could cause direct and significant harm to the patient if staff on site are not appropriately qualified, educated, and competent in all aspects of MRI safety relevant to their role

1. Staffing levels on site

- There must be a sufficient complement of appropriately trained staff in the department to ensure the safety of patients and service users.
- The complement of staff should be such that the operator can always maintain visual contact whilst the patient is undergoing the scan in line with MHRA ³ guidance (i.e. they must not be called away from the scanner console to screen or admit patients whilst an examination is in progress)
- There must be sufficient appropriately trained staff to ensure the safe removal of the patient in an emergency
- There must be sufficient appropriately trained staff to allow time for the safety screening process

2. MRI safety education

The SoR and the British Association of MR radiographers ⁴ recommend that all staff working in a clinical or clinical support role in MRI should have as a minimum

- Knowledge and understanding of the threats posed by the static magnetic field
- Understanding of the requirements and layout of the MR controlled access area and MR environment (scan room)

3. Safety Guidelines for magnetic resonance imaging equipment in clinical use MHRA 2021

4. Safety in Magnetic Resonance Imaging. The Society of Radiographers 2018

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- Awareness of MR authorised personnel and other categories including their own and access rights
 - Understanding of the screening process
 - Understanding of the nature of a magnet quench and when a system may need to be quenched by the operator
 - Understanding of the MR safety labelling system for MR equipment
 - Awareness of the requirement for hearing protection and competence in the correct positioning
 - Awareness of the RF coils and competence in the correct positioning of coils and associated cables

Registered radiographer practitioners require further post registration education and training in the following areas

- Bio effects of the static magnetic field
- Bio effects of the time varying gradient magnetic fields
- Bio effects of radio frequency (RF) radiation
- Projectile and attractive forces
- Exposure Value Limits
- Sequence selection and parameter manipulation
- Implants and devices

3. The pre-MRI safety screening process

- The safety screening process is a critical component in ensuring a patient's suitability to enter the MR environment. It involves a comprehensive form, and often, key information only emerges during the in-person review of the form with the patient at the time of the appointment.
- It is essential that on-site staff possess sufficient knowledge and experience to conduct this process effectively.
- A clearly defined written procedure must be in place to assign responsibility for the final approval of the screening form.
- Where responsibility for signing off the screening process is assumed by the expert at the remote hub, there must be a reliable method for that expert to engage directly with the patient.

5. Other considerations

- Some configurations do not allow the expert in the remote hub visual access to the scanner room. It is then particularly important that all staff on site are fully trained in the correct positioning of the patient, RF coils, and associated cables.

CT specific considerations

The Ionising Radiation (Medical Exposure) Regulations 2017 ⁵ (IR(ME)R) and The Ionising Radiations Regulations 2017 govern the use of ionising radiation in CT. The use of remote technology must comply with the legislations including all IR(ME)R duty holder responsibilities.⁶

An operator must not conduct any exposure or any practical aspect without being adequately trained. A trainee may undertake practical aspects of the procedure as part of practical training if this is done under the direct supervision of a person who is adequately trained. SoR believes direct clinical supervision implies the operator is physically working alongside the trainee.

Other considerations

Management of medicines is not considered in depth in this guidance but is an important aspect to consider when planning the use of the remote operation technology in CT and MRI services.

5. [The Ionising Radiation \(Medical Exposure\) Regulations 2017](#)

6. [IR\(ME\)R: Implications for clinical practice in diagnostic imaging, interventional radiology, and diagnostic nuclear medicine](#)



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