

Best Practice Statement: Safety During Medical Emergency Situations in the Magnetic Resonance Imaging (MRI) Scanner

Background

Magnetic Resonance Imaging (MRI) uses a powerful, permanent magnetic field to generate diagnostic images. This magnetic field is always active, including during medical emergencies, and presents unique and significant hazards. The MRI scanner room, also known as the *MR Environment* or *Controlled Access Area*, can pose serious risks to both patients and staff if safety protocols are not strictly followed.

Magnetic objects can become dangerous projectiles in the MR Environment.¹ Individuals entering this area must be appropriately screened and authorised. In particular, emergency responders unfamiliar with MRI safety may inadvertently place themselves and others at risk during medical emergencies, including cardiac arrest. Serious incidents have occurred due to inadequate awareness of the permanent magnetic field and its implications during emergency response¹².

In most centres, the MRI clinical team is trained to safely manage emergencies within the MR Environment. Resuscitation teams typically remain outside the scan room while the patient is rapidly transferred to a designated safe area for further assessment and resuscitation³. However, in mobile or relocatable MRI units, spatial constraints may present additional challenges. It is essential that all healthcare professionals understand their local procedures and the risks associated with emergency situations in MRI settings.

¹ Medicines and Healthcare products Regulatory Agency (2021) [Safety guidelines for magnetic resonance imaging equipment in clinical use](#).

² NHS England. National Patient Safety Alerts and incident reporting data. <https://www.england.nhs.uk/patient-safety/>

³ The Society and College of Radiographers and the British Association of MR Radiographers (2019) [Safety in Magnetic Resonance Imaging](#). First edition.

Key Points and Recommendations

- A permanent magnetic field is always present in MRI and **cannot be turned off**, even during a cardiac arrest.
- No individual may enter the Controlled Access Area without completing appropriate MRI safety screening, regardless of the urgency of the situation.
- Resuscitation equipment must never be taken into the patient in the MR scan room when the magnet is energised unless it is either MR Safe or MR Conditional¹
- All clinical staff who may be required to respond to emergencies in or near an MRI scanner must be made aware of the risks posed by the magnetic field and the relevant local procedures¹.
- Staff responding to emergencies should be familiar with the location of all MRI scanners in their organisation and understand the standard operating procedure for managing medical emergencies in these areas.
- Given the variation in MRI suite design, including in community and mobile settings, it is strongly recommended that all MRI providers conduct regular multi-disciplinary emergency response drills¹. These should include extrication simulations to ensure safe transfer of the patient to an appropriate area for resuscitation.
- In exceptional circumstances, members of the resuscitation team may be required to enter the Controlled Access Area. These staff members **must always be accompanied** by trained MRI personnel¹, as they may not have the necessary knowledge to assess the risks of entering the MRI environment.
- Staff must always observe MRI safety signage and comply with local policies regarding safe access to the Controlled Access Area.
- Education and training should be made available to first responders and emergency staff.

Methodology

This statement was developed by a working group of the British Association of MR Radiographers (BAMRR) Policy Board, with input from professionals experienced in MRI safety, clinical practice, education and emergency response.

The development of the statement was informed by a review of relevant literature, published safety guidance and incident learning, including:

1. Medicines and Healthcare products Regulatory Agency. *Safety guidelines for magnetic resonance imaging equipment in clinical use*. February 2021.
2. Society and College of Radiographers and British Association of MR Radiographers. *Safety in Magnetic Resonance Imaging*. February 2019.
3. Royal College of Radiologists. *Guidance on gadolinium-based contrast agent administration to adult patients*. 2019.
4. American College of Radiology. *Manual on MR Safety*. 2026.
5. Published reports and incident learning relating to serious MRI safety incidents, including the Michael Colombini case. BAMRR contacted the MHRA for advice on current references for MRI safety incidents, and the Michael Colombini case was identified as a relevant example.

Given the limited availability of high-quality comparative studies in this specific area, the recommendations are based on a combination of available evidence, established MRI safety principles, incident learning and expert consensus.

Draft recommendations were developed and refined through working group discussion. External stakeholder feedback was considered and incorporated where appropriate, to support clarity, clinical relevance and alignment with current practice.

All contributors were asked to declare any potential conflicts of interest. No conflicts were identified that were considered to influence the content of this statement.

BAMRR will review this statement every three years, or earlier if significant new evidence, changes in practice, or updated national or international guidance emerge.

Produced in collaboration with the British Association of MR Radiographers (BAMRR)

Established in 1990, the organisation promotes education and supports the professional development of MR Radiographers and other Health Care Professionals who work within the field of MRI. BAMRR works with other national organisations to contribute to the development of guidelines and best clinical practice in the UK. For more information, visit bamrr.org.

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