

BAMRR MRI Safety Week 2026



What is MRI Safety Week?

This week includes the anniversary of the tragic accident that resulted in the death of six-year-old boy, Michael Colombini from a projectile incident (oxygen cylinder) during an MRI scan in America on July 27th, 2001.

<https://abcnews.go.com/US/story?id=92745&page=1>

To commemorate this, BAMRR will be producing safety and educational materials and collaborating with the British Institute of Radiology (BIR), International Society for MR Radiographers & Technologists (ISMRT), the Society and College of Radiographers (SCoR) and The Institute of Physics and Engineering in Medicine (IPEM) in sharing links.

BAMRRR MRI Safety Week 2026



What is BAMRRR focusing on for MRI Safety Week 2026?

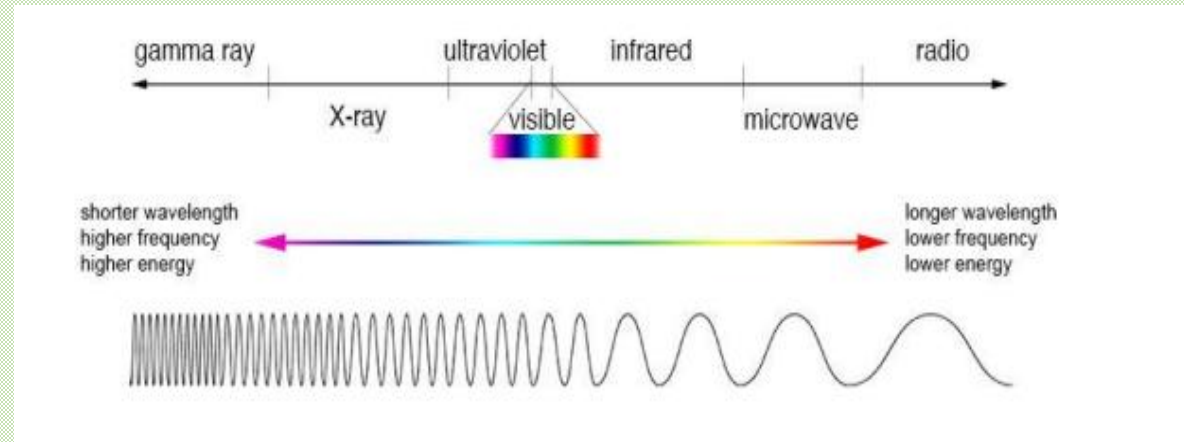
Each day, BAMRRR will produce MR safety and educational information from each of the letters below, so check our website daily....



Waveguide (RF):

RF waveguides are hollow metallic pathways that penetrate the RF cage that allow a fluid flow (eg AC, water and medical gases) into the magnet room without causing any RF leakage and artefact.

Conductive cables or electrical cords should never be passed through such openings unless specifically designed and filtered for that purpose.



Electromagnetic Spectrum The range of frequencies used in MRI (10-300 MHz) are relatively low - from the radio wave end of the electromagnetic spectrum and so a cylinder with a length: width ratio of 4:1 or greater will be effective at blocking radiofrequencies in the desired range. Therefore, RF waveguides have a specific design.

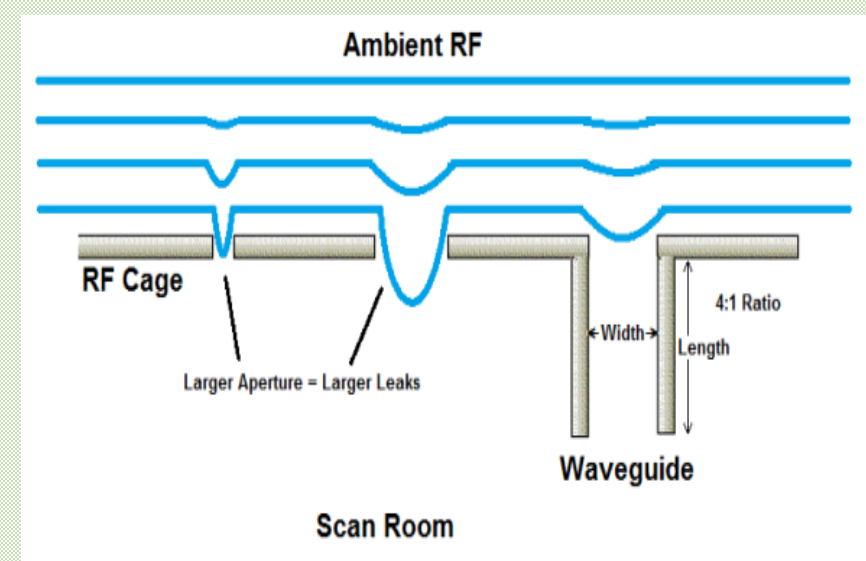
(Thankyou to Matthew Benbow BAMRR for this slide)

Waveguide (RF):

So, by designing a waveguide to be purposely too small for the wave to propagate, it can be made to become a blocker of waves, rather than a channel to assist their passage. As such we can be provided with a channel that allows activities such as general anaesthetic MRI examinations without the expense of highly specialist MRI conditional infusion pump equipment within the scan room.

There is a cut-off point where higher frequencies will get through but those below will be blocked, and this can be exploited for the purpose needed in MRI, i.e. to maintain the integrity of the RF cage. This cut-off frequency depends on the shape and size of the cross section of the waveguide. The larger the waveguide is, the lower the cut-off frequency for that waveguide. Waveguides can have either a circular or rectangular cross section, but those commonly used in MRI RF cages are commonly circular and the cut-off frequency for a waveguide with a circular cross section of radius α is given by the following equation:

Where c is the speed of light within the waveguide, μ is the permeability of the material that fills the waveguide and ϵ is the permittivity of the material that fills the waveguide. An MRI waveguide must therefore be built to have a certain diameter relative to the wavelength of the signal. It needs to be sufficiently narrow to ensure that the relevant electromagnetic fields cannot propagate, and this diameter is consequently dependent on the frequency of the RF that needs blocking.

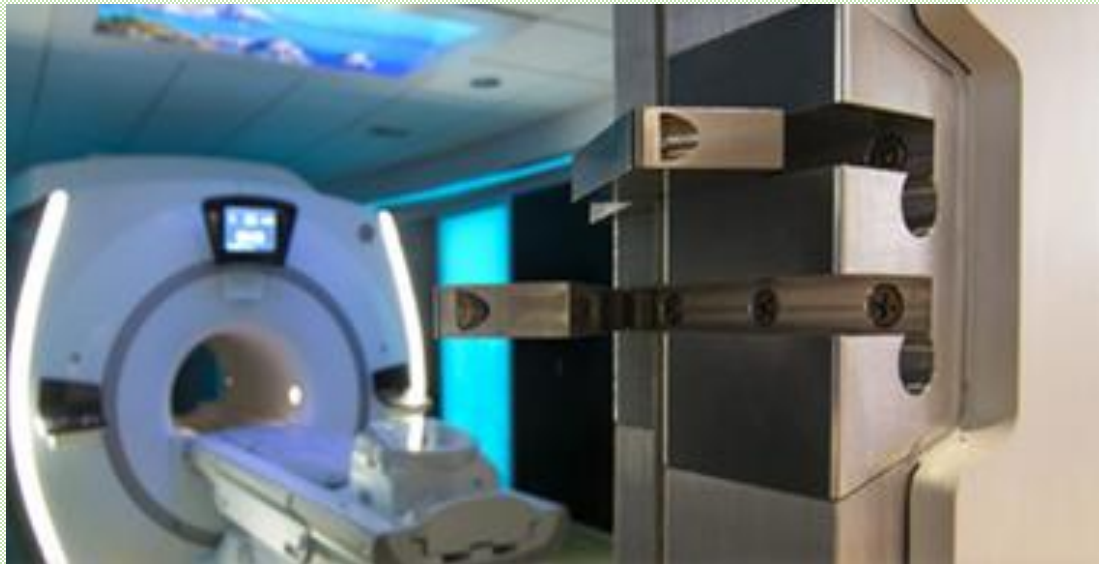


$$\text{Cut-Off Frequency } f_c = \frac{1.8412}{2\pi\alpha\sqrt{\mu\epsilon}} = \frac{1.8412c}{2\pi\alpha}$$

Thankyou to Matthew Benbow
BAMRR for this slide

Waveguide (RF):

There is a new design RF door that has an inbuilt waveguide, to facilitate intravenous lines being passed through rather than using the 'cat flap' or not fully closing the RF door (depends if RF door microswitch present), which may save on other equipment costs (MR conditional infusion devices).



<https://www.pdcbiz.com/products/mri-door-iv-waveguide/>

Education and Training:

Every member of the MRI team has a role in safety.

- ✓ Department induction & orientation completed
- ✓ Role specific MR safety training
- ✓ Local rules and procedures understood
- ✓ Competency assessed and maintained
- ✓ Regular refresher training
- ✓ Emergency response training

Ask Yourself:

Would I know exactly what to do if an MR safety incident occurred today?

Education and Training:

Static Field

Projectile effect
Implants & devices

RF Energy

Heating & burns
Safe coil use
Implants & devices

Gradients

Physiological effects
Equipment awareness
Implants & devices

Patient Protection

Safety screening
Hearing protection
Safe positioning
Contrast & Medicines

Cryogenics

Quench
Asphyxiation

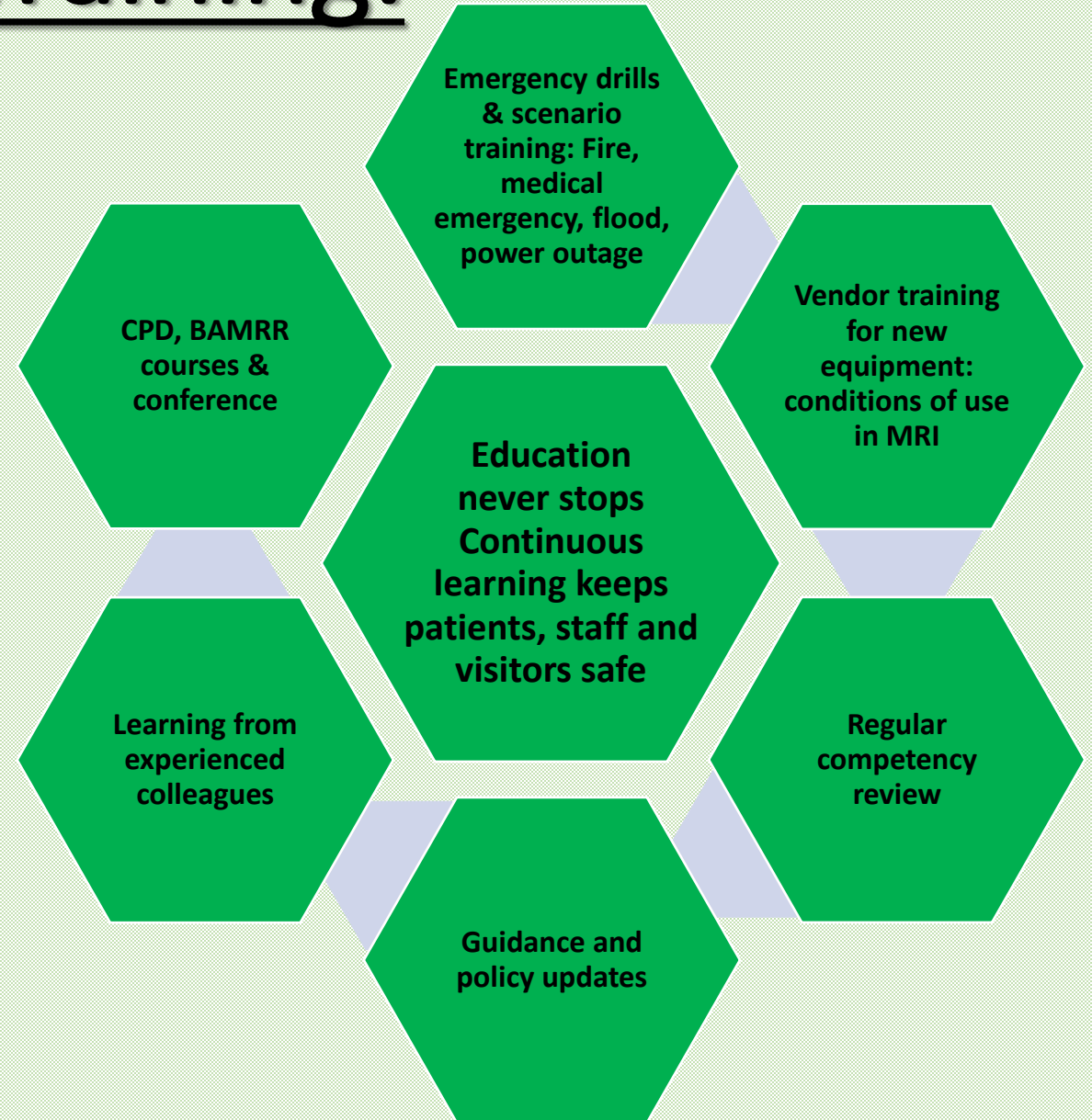
Equipment

Conditions
Labelling
Safe use and maintenance

Understanding why risks occur is just as important as knowing the rules....

Education and Training:

Safety Challenge: Can you explain the projectile effect, a quench, and MR Conditional labelling for your scanner?



Emergency – Resuscitation in MRI:

BAMRR is proud to announce it's involvement with the Resuscitation Council UK to develop a "Best Practice Statement"

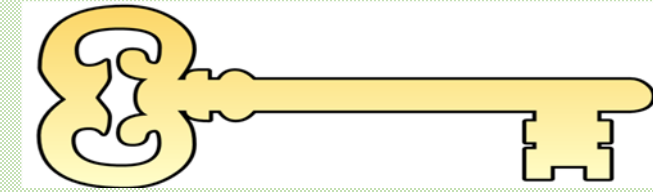


Best Practice Statement: Safety During Medical Emergency Situations in the Magnetic Resonance Imaging (MRI) Scanner

Thanks to Cath (BAMRR Safety Representative) for all her hard work & commitment to this excellent document. Please see the full document on the BAMRR website <https://www.bamrr.org/news-events/> Or visit the resus council website <https://www.resus.org.uk/sites/default/files/2026-07/Resus%20Council%20BAMRR%20Best%20Practice%20Statement%202026-07%20V1%20%28publish%29.pdf>



Keys and Security:



The **MHRA** advises patients and visitors should be provided with a security locker to lock up their belongings before their scan. Locker keys can become a projectile if taken into the magnet room.

Therefore, they should be non-ferrous (brass or aluminium). Do you have spare keys for each locker?

Digital codes/combo locks are another option but do you have a procedure if the patient forgets the code?

Are patients reminded not to bring valuables to their appointment in the patient information leaflet?

Before entering the magnet room, everyone should empty their pockets.

Is there a robust procedure for where the patient can safely leave their key during their examination?

How is your department and Controlled Access Area secured?

Is it by key, swipe/proximity card or by digital key code/combo lock? Are codes changed regularly?

Is access audited and reviewed?

Do you have a key safety box for departmental keys?

Is there a process for Emergency Access out of hours?

Are drugs/contrast cupboards securely locked?

Is the magnet room RF door locked overnight and when no-one is in the department?

Consider the differences between departmental, mobile and relocatable units.

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Hope you have enjoyed the materials from the letters **WEEK** from Day 3.

Please join us tomorrow to for our **MRI Crossword**....

BAMRR are also pleased to direct you to what BIR, ISMRT and SCoR have produced for MRI Safety Week and encourage you to visit the MRI page for IPEM.

<https://bir.org.uk/get-involved/special-interest-groups/bir-magnetic-resonance.aspx>

<https://www.ismrm.org/mr-safety-links/mr-safety-week-2026>

<https://www.sor.org/>

<https://www.ipem.ac.uk/resources/mri/>

If you missed our materials from MR Safety Week from previous years, they are available on the BAMRR website <https://www.bamrr.org/safety/>