

Suggested pre-exam reading for the American Board of MR Safety (ABMRS), UK-modified, MR Safety Officer (MRSO), MR Medical Director (MRMD), MR Safety Expert (MRSE) exams.

**Please remember to take photographic ID with you on the day of the exam**

To be held in London at 2pm on Tuesday, 24<sup>th</sup> of August 2021 in:

<https://www.leonardohotels.co.uk/hotels/london/leonardo-royal-hotel-london-city>.

If you have not done so already, please register for an exam, by clicking on the link below:

<https://uk.mrtca.com/events/mrso-mrse-mrmd-06-23-2020-london-uk/>

The following exam information and some of my suggested exam pre-reading material should give you a good grounding in all aspects of MRI safety.

Please note that the ABMRS do not endorse any specific study materials but there are several learning resources that they recommend that those preparing for any of their exams should be familiar with:

- The exam syllabus on the ABMRS website <https://abmrs.org/examination-content-syllabus/>
- MHRA Safety guidelines for Magnetic Resonance Imaging Equipment in Clinical Use (February 2021): [MHRA \(publishing.service.gov.uk\)](https://www.mhra.gov.uk/publishing-service)
- The ACR MRI Safety website and manual which contains a link to the ACR Manual on MR Safety: <https://www.acr.org/Clinical-Resources/Radiology-Safety/MR-Safety>

The exam will be composed of 100 multiple choice questions, based on seven subject matter 'domains':

1. Static Magnetic Fields
2. Gradient Magnetic Fields (Time-Varying)
3. Radio frequency Fields
4. Gadolinium / Pregnancy
5. Facilities / Cryogenics
6. Standards / Regulatory
7. Clinical Applications

The MHRA and ACR guidance documents are the main ones to use when prepping but it is advisable to read as widely as possible. For this UK-modified exam, a few questions will reflect MHRA guidance and UK policies rather than the ACR guidance.

It may be useful to understand, for example:

- Acoustic noise limits
- Pregnancy and MR exposure
- Types of MR Authorised personnel and their roles
- Supervision in the Controlled Access Area (CAA) and the definition of CAA
- Labelling and meaning of MR Safe/Unsafe/Conditional items/devices
- Active and passive implants
- Patient burns - their causes and their mitigation
- IEC/ICNIRP recommendations
- Health and Safety at Work Act
- Types of contrast agents related to risk and how to minimise the risk
- MRI unit Signage
- How to deal with any type of emergency in an MRI unit

Some more suggestions that others have found useful are:

- ACR Guidance document on MR Safe Practices: Updates and Critical Information 2019: <https://www.acr.org/Practice-Management-Quality-Informatics/Quality-Care-News/Newsletter/Quality-and-Safety-eNews-September-2019/Guidance-Document-on-MR-Safe-Practices>
- MRI scanner operator manuals. Start with your system manual, particularly the safety chapter. If you can read the corresponding chapter from the operators' manual of a different MR manufacturer, this is a good idea too. Different MR manufacturers may portray the same information in different ways. It may be useful to understand the following:
  - o static field
  - o magnetic spatial gradient
  - o RF power distribution
  - o transmit versus receive RF elements
  - o time-varying gradient power
  - o slew rates, rise time
  - o the meaning of Gauss and Tesla and converting one measurement to the other
- Guidance from the Royal College of Radiologists (RCR) on contrast agents, 2019: [https://www.rcr.ac.uk/system/files/publication/field\\_publication\\_files/bfcr193-gadolinium-based-contrast-agent-adult-patients.pdf](https://www.rcr.ac.uk/system/files/publication/field_publication_files/bfcr193-gadolinium-based-contrast-agent-adult-patients.pdf)
- Understanding the limits for scanning modes such as normal mode, first level controlled operating mode and understand SAR and B1+ rms.
- Other reading, for interest only, may be the Gadolinium Based Contrast Agents (GBCA) section of the ACR Contrast Manual: <https://www.acr.org/Quality-Safety/Resources/Contrast-Manual>
- Another source of MRI safety guidance from 2018 is from the Society and College of Radiographers: [https://www.sor.org/sites/default/files/document-versions/safety\\_in\\_magnetic\\_resonance\\_imaging\\_2018\\_final\\_word\\_copy.pdf](https://www.sor.org/sites/default/files/document-versions/safety_in_magnetic_resonance_imaging_2018_final_word_copy.pdf)
- For more varied reading and to get information in a different slant, but for interest only, you could read other international guidance, which the exams have previously been based on, such as the RANZCR MRI Safety Guidelines: <https://www.ranzcr.com/documents/512-mri-safety-guidelines/file> or the Australia TGA information on Gadolinium-based contrast agents: <https://www.tga.gov.au/alert/gadolinium-based-contrast-agents-mri-scans> but please remember this is only for interest as it might help to cement some MRI safety concepts but be aware their recommendations may well differ from the MHRA guidance.
- In addition there are commercial online training courses for advanced MRI safety knowledge such as the RITE Advantage course which contains 5 suggested mock exams and 80 MR safety lessons.
- You can also find some suggested mock exam questions and many free MRI safety resources by registering on the MRI Buzz website: <https://www.mribuzz.com/register/> and <https://www.mribuzz.com/practice-mri-mrso-exams/>

As stated above, the ABMRS does not offer any recommendations on any commercial alternatives but you can get the feedback of others who have sat for the exams in some of the MRI safety communities, such as: <https://www.facebook.com/groups/MRIsafety/> and the UK MRI safety facebook group

Kanal's London MRSO/MRMD 2021 course contents, describing some of the MRI safety topics, are provided to all course registrants through: [mrifatematters@btinternet.com](mailto:mrifatematters@btinternet.com)

**It is important to understand that any examinee should expect to study for this exam. Any preceding course should not be considered enough preparation to pass. By attending Kanal's course, that may reinforce the learning but please study prior as the exam is broad ranging. Studying/cramming the night before may not lead to success and will likely create unnecessary stress for you.**