



# Junior Radiologists' Forum examination guidance on the Fellowship of The Royal College of Radiologists (FRCR)

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# Introduction

Before beginning clinical radiology training, no-one really tells new trainees how central exams will be in their lives over the next few years. Yet the life of a radiologist in training is a steeplechase of exams. Passing exams at the appropriate stage of training is an essential part of passing the annual review of competence progression (ARCP) and moving forward through your training.

There are several components of the Fellowship of the Royal College of Radiologists (FRCR) examination, all of which are rigorous and challenging but fair. The examination is designed to test you across a range of areas to ensure that you are competent to become a consultant radiologist.

This document gives the trainee view on all the components of the FRCR examination and provides top tips from people who have passed the exams themselves. It has been commissioned by the Junior Radiologists' Forum (JRF) to help guide trainees. We hope it is of use to you and wish you the best of luck with the FRCR.

Dr Fiona Pathiraja  
*Chair, Junior Radiologists Forum 2014–2015*

# General tips

1. All parts of the FRCR examination have strict deadlines for applications. You must ensure you get your application in on time. There have been many instances where trainees have forgotten to apply on time resulting in having to take the exam in the next sitting.
2. What may be right for your peers and colleagues may not work for you. Comparing yourself to the physics genius in your year will not be helpful to your own revision. Take time to understand the gaps in your knowledge and how best you learn before embarking on the exams.
3. Expect to find some parts of the examination easier than others. While you may be excellent at understanding physics (FRCR part 1) and memorising the Bosniak classification of renal cysts (FRCR part 2A), you may not be that strong at coming up with lists of differentials (FRCR 2B) or recalling the muscles of the forearm (FRCR part 1).
4. The Radiology – Integrated Training Initiative (R-ITI) is an underused resource in all aspects of the exam. Not everyone enjoys e-learning but do look at it when starting out as it covers the syllabus very well.
5. Be sensible about taking the exams. The exams are not cheap and you should aim to maximise your chances of passing by giving yourself enough time to prepare. If you have your wedding two weeks before the 2A modules or are moving house the week of the 2B, you may wish to reconsider taking the exams in those particular sittings.
6. Know where you should be for your stage of training. ARCP guidance in the curriculum currently states that trainees should aim to achieve:
  - ST1 – FRCR part 1
  - ST2 – FRCR part 2A (3 modules)
  - ST3 – FRCR part 2A (3 modules)
  - ST4 – FRCR part 2B
7. Do not get over-enthusiastic about attending courses. It is easy to look to every course available in a state of panic as the exam date looms. Try to be judicious in choosing courses to supplement your work. Don't let them take over your revision (and your bank balance). Many trainees feel they over-do courses and, given another chance, they would rather save that money for something else.
8. If you are looking to achieve academic excellence, there are two awards available for those achieving the highest marks in the 2A exam (Frank Doyle medal [[www.rcr.ac.uk/frank-doyle-medal](http://www.rcr.ac.uk/frank-doyle-medal)]) and for an outstanding candidate in the 2B exam (FRCR Gold Award – formerly the Rohan Williams medal [[www.rcr.ac.uk/CR-gold-award](http://www.rcr.ac.uk/CR-gold-award)]).



# First FRCR examination

## The exam process

The first FRCR examination assesses the physics and radiological anatomy that underpin diagnostic medical imaging. Taken as two separate examinations, the majority of candidates elect to sit both papers in the same sitting, typically in March. The examinations are held by The Royal College of Radiologists (RCR) three times per year (September, March and June).

## Physics

The physics exam can be taken at a number of centres: usually Birmingham, London, Manchester and Dublin, and Hong Kong and Singapore for overseas candidates. Candidates are asked to provide their first and second choice centres at the time of application. The physics exam is a multiple choice written question paper. Each candidate has 120 minutes to answer 40 questions. Each question is presented with a topic, such as 'regarding Doppler ultrasound' and then followed with five statements that must be marked as either true or false. Example questions can be found on the RCR website:

[www.rcr.ac.uk/clinical-radiology/examinations/first-frcr-examination-0](http://www.rcr.ac.uk/clinical-radiology/examinations/first-frcr-examination-0)

Typically the exam is subdivided into topics, with an equal number of questions allocated to the physics of each imaging modality.

## Anatomy

The anatomy exam takes place at the RCR in London. Overseas candidates can elect to sit the exam in Hong Kong or Singapore. Depending on the number of applications that the College receives, candidates are assigned to an examination session over a period of one to three days immediately following the physics exam.

Anatomy is examined by an image-viewing session delivered using OsiriX software on individual Apple Mac workstations. Each candidate has 90 minutes to view 100 images and answer a related question. The majority of these will be '*What structure does the arrow point to?*' but there will be a small number of other questions, such as '*At what age does the structure arrowed normally fuse during skeletal development?*' '*What normal anatomical variant is demonstrated?*' Examples, and an informational video, can be found on the RCR website:

[www.rcr.ac.uk/clinical-radiology/examinations/first-frcr/anatomy-image-viewing](http://www.rcr.ac.uk/clinical-radiology/examinations/first-frcr/anatomy-image-viewing)

It is imperative to read the question carefully to avoid simply naming a structure in the few applied anatomy questions.

Exam results are provided online on the RCR website two weeks after the examination. This is followed by written confirmation. Unsuccessful candidates are provided with their score and pass mark. No additional information, other than 'pass' is provided to successful candidates.

The pass mark varies for each sitting but in March 2014 it was 79% for anatomy and 75% for physics. For all FRCR examinations there is a limit of six attempts, after which candidates must provide evidence of additional educational experience. However, successful completion of the FRCR Part I is usually an ARCP requirement for progression to ST2.

## Tips on what to study

The first place to start is the RCR website, in particular the speciality training curriculum:

[www.rcr.ac.uk/radiology/curriculum](http://www.rcr.ac.uk/radiology/curriculum)

Commencing your revision as early as possible is recommended. Most candidates will be unfamiliar with radiological physics and will find radiological anatomy a new challenge irrespective of their previous training. Preparation for the exams should commence about three months in advance.

## Physics

The physics exam tests understanding and it is vital that candidates have a good grasp of the key concepts. Most training schemes provide some form of structured teaching for the physics examination, usually run by the medical physics department. Make the most of these sessions by reading in advance and asking questions.

The R-ITI physics modules provide an excellent foundation for all candidates irrespective of the local teaching provided. There is a considerable amount of content, and it is therefore recommended to use this resource early in your revision. It is worthwhile making notes or highlighting sections to return to at a later date to consolidate your revision. Each session usually includes some questions to test your understanding of the material covered.

[www.e-lfh.org.uk/programmes/radiology/](http://www.e-lfh.org.uk/programmes/radiology/)

Most candidates use 'Farr's Physics for Medical Imaging' as their key text. This covers the majority of the syllabus, but certain sections are more comprehensive than others. Typically it is felt that supplemental texts are required for ultrasound and magnetic resonance imaging (MRI) to fully cover the syllabus. Whilst Farr's is the most popular choice, there are many other comprehensive texts available (some of which are listed below), which may be preferred.

MRI physics is well explained in 'MRI at a glance' and for a more in-depth review in 'MRI from picture to proton'. Texts targeted at radiographers can also be of immense value in explaining the concepts in an understandable way. Film-screen radiology is largely historical and, whilst on the syllabus, this does not seem to have appeared recently in the exam questions.

## Useful texts for revision

1. Allisy-Roberts P and Williams J. *Farr's physics for medical imaging*, 2<sup>nd</sup> edn. Philadelphia: Saunders Elsevier, 2008.
2. Dendy P and Heaton B. *Physics for diagnostic radiology*, 3<sup>rd</sup> edn. Florida: CRC Press, 2012.
3. Bushberg JT, Seibert JA, Boone JM, Leidholdt EM. *The essential physics of medical imaging*, 2nd edn. Lippincott Williams and Wilkins, 2000.
4. Westbrook. *MRI at a glance*. Hoboken: Wiley Blackwell, 2009.
5. McRobbie DW, Moore EA, Graves MJ, Prince MR. *MRI from picture to proton*, 2<sup>nd</sup> Edn. Cambridge: Cambridge University Press, 2006.

Once a basic understanding of the concepts has been achieved, testing this knowledge as early as possible with multiple-choice questions (MCQ) questions is invaluable. There are a number of dedicated practice MCQ books available in addition to online resources. It is worth checking what books are available in the hospital or university library or purchasing them from your colleagues as the costs soon add up. Some texts are better than others in terms of accuracy. If you disagree with an answer it is always worth cross-referencing the question, as the book may indeed be wrong!

## Useful MCQ textbooks:

1. Varut V, James J, Gray R, Nensy R, Sheun V, Ninan T. *MCQs for the first FRCR*. Oxford: Oxford University Press, 2010.
2. Bhogal P, Conner T, Bhatnagar G, Sidhu H, Malhotra A. *Succeeding in the FRCR Part 1 exam*. Nottingham: Developmedica, 2009.
3. Mair G, Baird A, Nisbet A. *Get through first FRCR: MCQs for the physics module*. London: The Royal Society of Medicine Press, 2009.

## Useful MCQ online resources

1. [www.examdoctor.co.uk](http://www.examdoctor.co.uk) (Range of access periods available; 1 week £33.75)
2. [www.onexamination.com/radiology/first-frcr-physics](http://www.onexamination.com/radiology/first-frcr-physics) (Range of access periods available; 1 month £26)
3. [www.frcrexam.org](http://www.frcrexam.org) (£19.99)
4. <https://play.google.com/store/apps/details?id=com.ynotvc.an.qans> (Android app; £3)

There are a few revision courses available, usually held in February each year.

1. [www.leicesterradiologycourses.co.uk](http://www.leicesterradiologycourses.co.uk) (£200; 2 days)
2. [www.merseyschoolofradiology.co.uk/courses.htm](http://www.merseyschoolofradiology.co.uk/courses.htm) (£100; 1 day or £185; 2 days)
3. BIR – Essential physics for the FRCR (1 day) (1 day; BIR member £40, non-member £55)

There are also a range of useful websites including:

1. [www.sprawls.org/resources/](http://www.sprawls.org/resources/)
2. [www.revisemri.com](http://www.revisemri.com)
3. [www.mr-tip.com](http://www.mr-tip.com)

It is also worth searching YouTube ([www.youtube.com](http://www.youtube.com)) for videos of concepts that require further explaining, and *RadioGraphics* (<http://pubs.rsna.org/journal/radiographics>) articles which often provide good comprehensive overviews.

## Anatomy

Success in the anatomy examination is largely down to practice. Take every opportunity to quiz yourself and have others quiz you by pointing at structures on each imaging modality in different orientations. A few questions in the exam are dedicated to an understanding of surrounding structures, with questions such as 'what passes under/adjacent to/through' and also anatomical variants. It is therefore important to gain a good grasp of concepts and anatomical variants. A reasonable overview is provided in 'Anatomy for diagnostic imaging'.

Whilst general anatomy texts and attendance at any prosection courses are invaluable for gaining a general grasp of anatomy, this should not be at the expense of pure radiological anatomy. A good imaging atlas such as Weir & Abrahams will largely cover all of the exam questions one may encounter.

## Useful anatomy textbooks:

1. Weir J, Abrahams P, Spratt J and Salkowski L R. *Imaging atlas of human anatomy*, 4<sup>th</sup> edn. Edinburgh: Mosby Elsevier, 2011.
2. Ryan S, McNicholas M, Eustace SJ. *Anatomy for diagnostic imaging*, 3<sup>rd</sup> edn. Edinburgh: Saunders Elsevier, 2010.

Work through as many of the practice question books as you can. It is, however, better to limit yourself to a couple of books if you are running short of time rather than overwhelming yourself.

The more questions that you can answer instinctively, the easier the exam will be in terms of time pressure. You should aim to score at least 85% in these practice papers to pass the exam. Keep repeating the questions until you can; the more times you see a particular structure from different orientations the more likely you are to succeed. Typically, the level at which the practice books are aimed is sufficient for success in the exam. The Radcliffe Publishing books are a very close representation of the level at which the exam is pitched.

## Practice exam books

1. Quigley S, Flanagan S. *First FRCR anatomy practice examinations*. London: Radcliffe Publishing Ltd, 2011.
2. King A and Hudson B. *First FRCR anatomy examination revision*. London: Radcliffe Publishing, 2011.
3. Borg P and Alvi A R. *Radiological anatomy for FRCR Part 1*. London: Springer, 2011.
4. Thomas JD. *FRCR Part 1: Cases for the anatomy viewing paper*. Oxford: Oxford University Press, 2011.

There are a number of online resources that may also be helpful. Below are a few recommended sites and a quick web search will identify a host of sites and available apps.

1. [www.radiologymasterclass.co.uk](http://www.radiologymasterclass.co.uk)
2. <http://medquarterly.com/mq88/index.php/anatomy1>
3. <http://w-radiology.com>
4. [www.med.wayne.edu/diagradiology/anatomy\\_module/page1.html](http://www.med.wayne.edu/diagradiology/anatomy_module/page1.html)

5. <http://headneckbrainspine.com>
6. [www.anatomy.tv](http://www.anatomy.tv)
7. [www.anatomyatlases.org](http://www.anatomyatlases.org)
8. [www.radrounds.com](http://www.radrounds.com)
9. [www.imaios.com/en/e-Anatomy](http://www.imaios.com/en/e-Anatomy)
10. [www.sonoworld.com](http://www.sonoworld.com)

The majority of courses are a mix of tutorials and practice questions, typically held in January–February each year.

1. Leicester [www.leicesterradiologycourses.co.uk](http://www.leicesterradiologycourses.co.uk) (£120; 2 days) (limited to 16 candidates) – discount for attending both the anatomy and physics courses.
2. Leeds [www.frcr-courses.com/Home\\_Page.html](http://www.frcr-courses.com/Home_Page.html) (£200; 2 days) (limited to 35 candidates)
3. Mersey [www.merseyschoolofradiology.co.uk/courses.htm](http://www.merseyschoolofradiology.co.uk/courses.htm) (2 days £250).
4. Guys Anatomy Course. Contact [sarah.coulson@gstt.nhs.uk](mailto:sarah.coulson@gstt.nhs.uk) (2 days; £200)
5. Nottingham [www.frcrcourses.com/3.html](http://www.frcrcourses.com/3.html) (1 day)
6. Imperial FRCR Part 1 Anatomy Course. Contact [imperial.radiology.co.uk@gmail.com](mailto:imperial.radiology.co.uk@gmail.com) (1 day; £130)
7. <https://anatomy4frcr.com/the-course/webinars> and question sessions. Four modules and includes neuro/spine/head and neck, cardio-thoracic/vascular, gastrointestinal (GI)/genito-urinary (GU) and musculo-skeletal (MSK) anatomy. £60 for all modules. Multiple times throughout the year.

Details of other available courses can be obtained from:

1. [www.thesrt.co.uk](http://www.thesrt.co.uk)
2. [www.educatingmedics.co.uk/linkgrid.aspx?linktext=FRCR](http://www.educatingmedics.co.uk/linkgrid.aspx?linktext=FRCR)

The most frequent error is to neglect anatomy revision to concentrate on physics, with the thought that re-sitting the anatomy exam is less of a burden. It is of course ideal to pass both exams in one sitting so try and balance the revision timetable. It is very useful to take some time to consolidate revision in the final few weeks before the exams. Check what is permitted locally, as many departments are happy to allow a week of study leave for private study.

Finally, remember the exam is simply a hurdle to the next step in your training. Good luck!

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Dr Karen A Eley, ST1 (ACF) Cambridge*

# Final FRCR Part A Examination

Having passed the First FRCR examination, I found the prospect of sitting a whole raft of exams over the next 18–24 months quite daunting; especially with a busy work life, on-calls and an hour commute each way. I thankfully got through the Part A modules over three sittings.

The Final FRCR Part A examination is comprised of six single best answer (SBA) papers that cover all aspects of clinical radiology.

Module 1 – cardiothoracic and vascular

Module 2 – musculoskeletal and trauma

Module 3 – gastro-intestinal

Module 4 – genito-urinary, adrenal, obstetrics and gynaecology and breast

Module 5 – paediatrics

Module 6 – central nervous system and head and neck

The endorsement of books and websites purely reflects my personal experience.

## When should I sit the 2A modules?

The exams take place in September and March and when you decide to sit your first exam(s) largely depends on your individual training schemes. Some training programmes discourage their trainees from sitting ANY in the September of their ST2 year whereas other training schemes would not deny a trainee sitting all six in one go. In reality, the earliest you can sit the Final FRCR Part B exam is after 34 months of completed training (beginning of ST4). This therefore gives you four sittings over your ST2 and ST3 years to pass six exams.

I got through my First FRCR parts in March of my ST1 year. I was keen to sit two Part A modules in September. However, with a new-born baby in the house and over an hour commute each way to my peripheral hospital attachment, I soon realised two modules, which were then an unknown entity, might be a stretch. I therefore elected to sit one. Others deferred taking their modules until the March sitting to get a bit more clinical experience under their belt.

## Which modules should I take?

This question depends of a number of factors. The Final Part A exams are clinical exams so having prior exposure and experience in a particular field will put you at an advantage. As a first choice, gastrointestinal (GI) is a popular option. Most junior doctors have rotated through a general surgical firm or gastroenterology and as an ST1 radiology trainee, you get a reasonable amount of exposure to GI imaging and pathology.

Sitting the module based on your attachment or block improves your chances of passing. Studying for an exam you are rotating through will enable you to engage with the attachment and patients discussed at multidisciplinary team meetings (MDTMs) will have conditions you are revising. I found sitting the central nervous and head and neck (neuro) exam after rotating through the block very useful. However, from an orthopaedic background, I felt comfortable in sitting the musculoskeletal and trauma (MSK) exam before the attachment.

Some modules naturally group together due to either the body systems involved or subject matter overlap. neuro/MSK and GI/GU are popular pairings. Cardiothoracic and vascular (CVS), I found to be a fairly large module as it covers cardiac, thoracic and vascular as well as basic interventional radiology. Paediatric (paeds) seems to be one of the final exams sat. Over the other five modules, you would likely have covered a lot of core paediatric topics therefore the learning required here will be almost like revision.

## How many to sit?

This depends on the trainee. Most people do two modules in three sittings or three modules in two sittings. I sat one (GI), three (Neuro, MSK, GU) and two (CVS, paeds) over three sittings. I wanted the luxury of having a year between my last Part A and my Part B exam during which I could concentrate on writing papers and attending meetings.

Sitting one or two exams allows you to focus. It enables you to assess whether the time and effort you put in to this module/s was sufficient or not so that you can tailor your revision strategy for the subsequent exams. It is generally advisable not to take six modules in one go. It is natural to see what your fellow trainees are doing as there is an inherent competitive streak in all medics. Be true to yourself to avoid resits.



## How long should I prepare for?

One month per module seemed to be a common recommendation from my senior registrar colleagues. I must stress that this one month should be spent revising solidly; most or every evening and at weekends. Each module is different though and time taken to cover the syllabus will vary. If sitting more than one exam, you may find some overlapping topics (paeds and CVS). My final week or two of the revision period was spent going through questions from as many books as I could find. I was very much motivated by the prospect of finishing the part A modules and having a 12 month exam free window.

## How do I revise?

A good place to start is the R-ITI. It is useful as you can go through modules at work without the need for heavy expensive textbooks. With a format consisting of images, diagrams and questions scattered throughout the R-ITI module, many trainee prefer this option to bland reams of text. It gives you an idea of the size of the module and which topics need to be covered as it serves as an unofficial syllabus.

I started out using the R-ITI for the GI module before realising that some of the topics covered were very time consuming. Towards the end of my Part 2As, I used R-ITI to problem solve and was more selective in which modules I covered. If there was a subject matter I was not clear about or if I wanted more depth on a topic then I would do that particular R-ITI module ([www.e-lfh.org.uk/projects/radiology/](http://www.e-lfh.org.uk/projects/radiology/)). For the majority of my revision, I used the textbooks Brant & Helms and Primer and only occasionally dipped into Dahnert. I also used several websites listed below.

Textbooks, *RadioGraphics* review articles, websites and your various clinical radiology rotational attachments are all useful, as well as the individual training programme revision/study days. Attending work MDTs can be an invaluable learning resource as quite often, the patients entire management pathway is discussed, which is highly relevant for the exam.

## Useful textbooks:

1. Brant W and Helms C. *Fundamentals of diagnostic radiology*, 4<sup>th</sup> edn. Philadelphia: Lippincott Williams and Wilkins, 2012.
2. Weissleder R, Wittenbreg J, Harisinghani M, Chen J. *Primer of diagnostic imaging*, 5<sup>th</sup> edn. Missouri: Elsevier Mosby, 2011.
3. Dahnert W. *Radiology review manual*, 7<sup>th</sup> edn. Philadelphia: Lippincott Williams and Wilkins, 2011.

4. Grant LA, Griffin N. *Grainger & Allison's diagnostic radiology essentials*. Edinburgh: Churchill Livingstone, 2013.

## Online resources:

R-ITI – [www.e-lfh.org.uk/projects/radiology/](http://www.e-lfh.org.uk/projects/radiology/)

Radiology assistant – [www.radiologyassistant.nl](http://www.radiologyassistant.nl)

Radiopaedia – [www.radiopaedia.org](http://www.radiopaedia.org)

Learning radiology - [www.learningradiology.com/](http://www.learningradiology.com/)

Do not forget to cover all aspects of each module syllabus. For example, know your vascular interventional radiology for the CVS exam, and for the neuro, cover the head and neck aspect of the syllabus.

## Approaching the single best answer (SBA) paper

The question consists of a stem which is often a clinical question or scenario and then five possible answers. The candidate has to select the most appropriate option based on the stem and associated question. Therefore careful reading of the stem is imperative and knowing that each word and piece of information provided within the stem has been carefully considered by the examination panel and should be regarded as relevant.

The five possible options may contain one obviously correct and four blatantly incorrect answers. Alternatively the five choices may comprise of five possible answers with one being more likely. The latter example would be a more challenging question and requires a greater understanding and knowledge about that particular subject.

As there is no negative marking you must answer every question and therefore time management in the exam is vital. There are 75 questions in a two hour paper giving you over 1.5 minutes per question. I went through the paper answering those I could straight away and leaving the difficult ones until the end. For those harder questions, I would often make a note on the side of what the answer might be before coming back to it at the end. Running through the exam paper first time can often stir up some hidden pearls of wisdom which might help in some of the more challenging questions.

Some candidates may want to write their answers on a blank sheet if they think they are likely to change their mind several times over and want to avoid making a mess of the answer sheet. The danger with this is not being able to transfer your answers over on to the computer-read mark sheet in time. Another risk of doing this is that of transferring error where your answers may be out of sync with the questions.

Generally, if you know your stuff, you will be able to answer the question before looking at the options. If you see that answer, run with it. Try not to over-analyse as the writers of the exam are not trying to trick you. There is no substitute for good old fashioned book work and lots of it.

*Dr Neeraj Purohit Southampton Training Scheme*

# Final FRCR Part B examination

This is the examination that all trainees have heard about and dreaded since their first day in the radiology department. All consultant radiologists remember their 2B exam and you will hear numerous stories about 'monster examiners' or the 'killer viva case'. The truth is that this exam is as much about preparation as any professional exam taken before. Almost every candidate that has prepared correctly will have the knowledge to pass. Passing the exam then comes down to staying calm and confident on the day without letting your nerves get the better of you.

This exam assesses safety and competency to go on to the next stages as a senior radiology trainee and then consultant radiologist.

## Exam structure

The exam should be considered to consist of four components.

- 1) Rapid reporting test
- 2) Written long cases
- 3) Viva 1
- 4) Viva 2

Each component should be considered equally as important as the others and should also be viewed as a completely independent part of the exam. This is particularly important when it comes to the viva section. Viva 1 and Viva 2 are marked independently by different examiners who have no idea how the candidate has already performed.

## Marking scheme

Each of the four sections is marked out of eight, giving a total of 32. To pass the FRCR 2B, you need to reach the pass mark of 24/32. This suggests a mark of 6/8 in each component to be consistent with a pass.

This should emphasise even more how important each component really is.

Many candidates focus hard on the viva because it is clearly the most psychologically daunting part of the exam. However, the written components may provide the best opportunity to score highly, particularly in the rapid reporting test.

For example, let's say a candidate performs poorly in viva 1 and viva 2, scoring five in each (total so far = 10). Then that same candidate passes the written long cases with a 6 and gets full marks in the rapid reporting test (30/30) to score an 8. Their total is now  $5 + 5 + 6 + 8 = 24$ . And that candidate now has no more exams ever! A candidate must score a mark of six or above in a minimum of two of the four components. The point made here is that the rapid reporting test realistically provides the best opportunity to score an eight in any of the four components of the exam. It should therefore be given as much, if not more weight in the preparation period as the viva. The written components of the exam provide the best chance for a candidate to gain those few extra marks that may act as a buffer if one or both of the vivas don't go quite so well on the day. It is possible to score half marks (and unfortunately to fail by half a mark!).

A full breakdown of the scoring system is available on the RCR website: [www.rcr.ac.uk/clinical-radiology/examinations/final-frcr-part-b-examination-0](http://www.rcr.ac.uk/clinical-radiology/examinations/final-frcr-part-b-examination-0)

## Rapid reporting

*Exam technique:* You have 35 minutes to assess 30 plain films and decide if they are normal or abnormal and state the abnormality if there is one. If you correctly state a film is abnormal but don't say what the abnormality is (or give a different abnormality) then you will score 0 for that question. Don't leave any blank! There is no negative marking. Your total out of 30 marks will be given a score of between four and eight. The breakdown of this scoring is on the RCR website but you basically need 27/30 to score 6.

Try to get through the 30 images in 25 minutes so you have ten minutes to check your 'normals' again to make sure you aren't missing anything.

*Revision and preparation:* There is no doubt that the more plain films you have seen the better but many trainees feel they haven't seen enough as the 2B approaches. You can of course try to do lots of A&E plain film reporting but unless you are having all your films checked it can be difficult to know if you are missing anything. One way to approach this is to have a checklist for each part of the body and to make sure you are checking each and every area on the list whenever you look at a plain film.

*Example checklist for a foot X-ray:*

- Lis Franc injury
- Tricky phalynx fracture (trace around each bone individually)
- Stress fracture (2nd and 3rd metatarsals commonly)
- Base 5th MT fracture
- Ankle fracture (edge of film)
- Erosions.

To begin with you might have the list next to you then cover the list up and look at some more foot X-rays, checking back to your list to make sure you have looked at all the review areas. You may find you constantly forget to check for stress fractures so make that the first thing you look for. You can tailor a checklist to your liking and add things you commonly miss.

Think about what you dread coming up. If you hate looking at facial views then now is the time to practice. Most picture archiving and communications systems (PACS) systems will allow you to select by image type so you could select all facial views reported in the last month/year, look at them with your review area check list then check the report to see if you missed anything. With enough exposure you will be delighted to see a facial view in the exam! Practicing your review areas on every film you look at will make you faster at assessing plain films which is very useful in the exam but will also give you more confidence in everyday practice.

*Normal variants:* This is where many trainees struggle, you have been staring at the ankle X-ray for a while and you can see something ... a small bony fragment? Can't decide if it's a normal variant or an acute fracture? This is where there is really no substitute for experience as if you have seen lots and lots of ankle X-rays you will probably have asked yourself this question before and will know if it's a common site for an accessory ossicle. However, when you are revising/reporting plain films have a copy of 'Keats' next to you and if you see something you are not sure about look it up. If it gets to a few days before the exam and you still don't feel confident with a certain area, look through that chapter in Keats to see the variety of normal variants.

There are a number of rapid reporting courses and most FRCR 2B courses include a couple of sets of rapids for practice. In London, there are a series of dedicated rapid reporting days at Northwick Park hospital. Each day covers seven rapid reporting sets, has tips and tricks for interpretation and the same computer set up and Osirix software that are used in the exam. These are very popular and many candidates like to do at least a couple of days so book early.

[www.radiology-courses.com/courses\\_rapid.php](http://www.radiology-courses.com/courses_rapid.php)

Many hospitals have their own rapids packs either on old style film or in PACS folders. If you have friends based at other hospitals who are also doing the exam, get together and use each other's resources. The more packs you do the more you will recognise your areas of weakness.

There are online resources including free access rapid reporting sets that can be downloaded into Osirix software at: [www.frcrtutorials.com/rapidreporting](http://www.frcrtutorials.com/rapidreporting)

Some of these are very difficult so don't be despondent if you are scoring lower than you would expect.

In our experience, the abnormalities in the exam were not incredibly subtle or weird and wonderful – there were normal variants that could be mistaken for pathology, softer signs like elevated elbow fat pads but without an obvious fracture, edge of film cases and fractures that could be difficult to see if you didn't zoom in and follow around the edge of each bone. If you checked your review areas you would find them. Sometimes an abnormality is only seen on one of two or four views so check every one. At the end, review your 'normal' films again. If you have practised doing timed rapid reporting sets then 35 minutes is plenty.

Finally make sure you are confident with using Osirix before the exam. Know how to zoom in, move images around the screen and change the contrast. You don't want to be panicking about this in the exam.

## The long cases

This is probably the section for which candidates find it the most difficult to prepare. There are a few long case books available of varying quality and no past papers. Candidates have to report six cases in 60 minutes and these are displayed digitally on Osirix software. Each case will contain more than one image; there may be a chest X-ray (CXR), computed tomography (CT) and MRI. Some cases will be shorter and simpler than others so assigning 10 minutes per case is a risky strategy. Time is short in this component of the exam so time management is critical. You don't want to get to question six and find there at two CTs and three MRI series to look at and you only have four minutes left.

Each case is scored out of eight.

You MUST NOT leave a question blank as you will only score 3/8 for that question. Full details of the scoring can be viewed on the RCR website ([www.rcr.ac.uk/FRCR-part-b-exam](http://www.rcr.ac.uk/FRCR-part-b-exam)).



## Exam technique

You will be provided with an answer booklet split into sections with headings; observations, interpretation, principal diagnosis, differential diagnosis and management. Make sure you write something in every section and when there is a CT, MRI and CXR then detail the observations for each of these separately. If any emergency treatment is required such as for an abdominal aortic aneurysm (AAA) rupture then highlight this first in the management section before mentioning say investigation for a possible bone metastasis.

The difficulty is looking at all the imaging, writing down your observations and trying to put it together to come up with a unifying diagnosis in such a short time. Try to stick to a maximum of seven minutes per case as you will run over on the cases with lots of images and will need time at the end to fill in any gaps. Look at every series on soft tissue, lung and bone windows. Stay calm, stick to your time limit per case and write something in every section. Even if you are not sure, write down your first instinct and come back to it later if you have time.

If there is a CXR and chest CT, it can be useful to look at both before you note your observations for either as you might spot something on the CT that you can see on the CXR but you might not have noticed straight away (such as a small pleural effusion). However, don't make up findings – you probably won't see the interlobular septal thickening on a CXR!

In our experience, the findings in the long cases are not subtle – if you look on bone windows you will see the sclerotic metastases and the lung nodules on lung windows. The examiners are not trying to trick you. Look at every study in a case (CT, MRI and CXR), write observations for each and don't forget to consider the history given – there will be a reason for each piece of information given including the patient's age; sclerotic bone mets much less likely if the patient is 21 years old.

## Revision and preparation

Most trainees get the majority of their long case practice on FRCR courses and cases are of varying difficulty. It is useful to practice time management strategies but the cases themselves are of varying quality – sometimes too easy and sometimes too hard. It can also highlight an area to focus your revision on, for example, spinal pathology or appearance of liver lesions on MRI.

Start by looking at the two example cases on the RCR website ([www.rcr.ac.uk/FRCR-part-B-exam](http://www.rcr.ac.uk/FRCR-part-B-exam)).

Some of the same books that you use for viva revision will be helpful in preparing you for the long cases. There are specific long case books available but the image quality isn't fantastic and we would recommend borrowing

these from previous candidates if you can as you probably won't look at them again afterwards.

There are also practice long cases available on the FRCR tutorials website: [www.frctutorials.com](http://www.frctutorials.com)

In your work environment, you can try to simulate exam conditions when reporting a general CT list. Open a case without looking at the clinical details and write down as many findings as you can in five minutes. Then write down a primary and differential diagnosis before looking at the clinical details and previous imaging.

Save interesting cases to test fellow 2B colleagues and ask seniors and consultants to show you any potential long cases they come across.

Practise reporting any six cases in 60 minutes and writing out your answers. Finally, no matter how bad you think it was don't worry – many people feel they have failed after the long cases and end up passing. You will never be able to write six perfect answers in 60 minutes.

## The viva

Every candidate loses sleep in the weeks and months running up to the viva. It's important to remember that examiners WANT you to pass if you are good enough. They understand that the exam is an artificial setting and candidates are nervous. Almost all examiners do their best to ease nerves and guide candidates to demonstrate their knowledge and ability.

The real viva is a dialogue. It is not like exam courses where the aim is to see as many cases as possible and films come down as soon as the correct diagnosis is given. Examiners will probe you on your confidence, breadth of knowledge and further management. In the same way, they will expect you to voice your thought pattern and request previous investigations or additional history to back up or refute differential diagnoses. They might question you on your thinking and logic on decision making, for example '*would you biopsy this lesion or not?*' or '*If the patient was septic, would this change your differential diagnosis?*'

## When to start studying

Most people will have gained enough theoretical knowledge from the 2A examinations without having to do a great deal of reading revision for the 2B. Preparing for the 2B examination is a gradual process of accumulating knowledge and experience. The final 'push' should be more about technique, understanding the exam process and seeing as many cases as possible.

There is no doubt that working for this exam in small groups makes the whole process much easier. Do speak to seniors in your department about their experiences, particularly which consultants enjoy teaching and are particularly good at it. The general consensus is that preparation should start 3–4 months before the exam.

## Study methods

- Get together with your group and contact as many seniors as possible to provide you with 2B teaching.
- Set up a weekly teaching timetable if possible which gradually increases in intensity as the exam approaches
- Don't be afraid to have a good break before the exam. 2B preparation can feel 'all-consuming' at times. A complete weekend off can help to clear your mind and recharge your batteries.
- Keep a note of the cases seen in viva practice and read around them on the same day.
- Practise a speech for commonly encountered cases (for example, lung nodule, bone tumour, lobar collapse and so on) until you can say it on 'autopilot'. This will ensure you sound slick and don't miss anything when under pressure.
- It seems that, on average, candidates attend one dedicated rapid reporting course and two formal exam courses covering all components. Try to organise courses early. Some courses need to be booked well in advance.

## General tips

- See as many cases as possible. There's no such thing as seeing too many.
- Go to as many teaching sessions as possible. You may get tired and you won't always feel like it but you might just see that one case that pops up in the exam.
- Don't avoid the teachers that put you under pressure or make you feel uncomfortable. Those are the sessions that provide invaluable preparation when dealing with a difficult case or pressure situation.
- Don't get down or upset after a bad teaching session or bad practice viva. Almost every radiologist that has passed will tell about a bad day during their preparation. Learn from it, put it behind you and move on.

## Tips for viva day

- Dress smartly as you would for work and don't go overboard on aftershave/perfume.
- Go in with confidence and speak with confidence. Imagine yourself as a consultant radiologist.
- Never ever give up. One bad case does not fail you. If viva 1 goes badly, be even more determined to ace viva 2.
- Listen to the examiner. Everything the examiner says is of value and will be an attempt to point you in the right direction. Examiners will not try and trick you.
- Be methodical and systematic. This approach will particularly help you for the 'don't have a clue film'. Go back over your review areas, ask for clinical history and old or additional films.

*Dr Kunal Khanna FRCR Royal Free Training Scheme*

*Dr Jane Topple FRCR Royal Free Training Scheme*

*Dr Clare Ashwin FRCR Imperial Training Scheme*

*Dr Derfel Ap Dafydd Imperial Training Scheme*

# Resources

## Most commonly used books

Stephen Davies. *Chapman & Nakielny Aids to radiological differential diagnosis*, 6<sup>th</sup> edn. London: Saunders Elsevier, 2014.

O'Brien WT. *Top 3 differentials in radiology: A case review*. New York: Thieme, 2010.

Hussain S, Latif SA, Hall A. *Rapid review of radiology*. London: Manson Publishing Ltd, 2010.

Provenzale J, Nelson R, Vinson E. *Duke radiology case review: imaging, differential diagnosis and discussion*, 2<sup>nd</sup> edn. Philadelphia: Lippincott Williams & Wilkins, 2012.

Pope T. *Aunt Minnie's atlas and imaging-specific diagnosis*, 4<sup>th</sup> edn. Philadelphia: Lippincott Williams & Wilkins, 2013.

Eisenberg R. *Clinical imaging – an atlas of differential diagnosis*, 5<sup>th</sup> edn. Philadelphia: Lippincott Williams & Wilkins, 2010.

The Case Review Series by Elsevier Mosby (available online: [www.elsevier.com/books/book-series/case-review](http://www.elsevier.com/books/book-series/case-review)).

## Educational websites

[www.frctutorials.com](http://www.frctutorials.com)

An interactive learning site developed by Dr Sameer Shamshuddin.

[www.radiopaedia.org](http://www.radiopaedia.org)

Great for looking up images for specific conditions or signs you have read about.

## FRCR 2B courses – United Kingdom

Prices and dates are of course subject to change and candidates advised to book courses early (up to a year in advance) but often places will become available last minute due to people dropping out/booking more courses than they need or being unable to get time off, so it is worth checking back or adding your name to a waiting list. It is useful to go to courses outside your region as you will experience different pathology, case mix and examiners.



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