Medical Exam Prep

The COMPLETE Revision Guide for the

FRCR EXAM

Contents

Introduction

The FRCR exam is multifaceted and takes a long time to prepare for. It is an essential component to a career in Radiology in the United Kingdom. It is also used as a proof of excellence in Radiology in many other countries around the world.

We hope that this revision guide will help candidates with their revision and facilitate their goal of passing this challenging exam.

Good luck to all candidates!

Background and history

There have been many recent re-structurings of the various components of the FRCR exam. Historically the part 1 exam consisted of physics questions alone, but for the last few years, the candidate's knowledge of radiological anatomy has also been tested.

Initially, the candidate was shown 20 different images, each with five arrows and asked to write down the names of each of the structures they pointed to. The exam now consists of 100 single arrow, single answer questions. More recently still the exam has been modernised to facilitate computer-based answering.

Similarly, the final FRCR 2A exam has oscillated back and forth between a modular structure and an all-in-one exam, as well as upgrading from multiple true/false questions to the more robust single best answer format. Most recently the RCR have gone back to an all-in-one format with the first sitting of the new format taking place in December 2017.

The final FRCR 2B exam has seen fewer changes in the structure during the last few years, but as common practices change within the hospitals the content of the exam has changed to better reflect reality. Consequently, MRI studies which were previously considered the realm of the sub-specialist have now crept into the remit of the general radiologist and candidates should be prepared to discuss such cases. At the other end of the timeline, the number of historic-type cases has faded out although there are examiners who still relish the prospect of discussing the radiographic findings of what would now be managed with cross-sectional imaging.

First FRCR exam

Anatomy

The exam

The anatomy exam lasts 90 minutes and consists of 100 images with one question per image. Candidates are examined on an image viewing workstation delivered on individual workstations. At each station, there is a screen and a mouse, which has had the right click button disabled, but no keyboard. The exam uses the OsiriX software which enables the candidate to window and zoom the images if required. You will receive a short tutorial on using OsiriX before the exam. This video is available on the RCR website, and very similar tutorials are also freely available on Youtube.

Before the start of the exam, you will be given two images with which to practice using OsiriX.
During the exam, you are allowed to go back through the images any number of times and at any point.
There are spare workstations available should there be any problems with the workstation to which you have been allocated.

What is covered?

The exam does cover paediatrics and normal variants but aside from incidental mild degenerative changes, there will be no pathology on any of the images. Neither foetal imaging, nor cranial ultrasound is included.

The paper is divided equally across the following topics:

- Head, neck, spine
- Chest and cardiovascular
- Abdomen and pelvis
- Musculoskeletal

The images shown are also divided equally across the following areas:

- Cross-sectional
- Plain film
- Contrast studies (including cross-sectional images using contrast)

Included	***Not included***
✓ *Paediatrics*	× *Foetal imaging*
✓ *Normal variants*	× *Cranial ultrasound*
✓ *Minor incidental degenerative changes*	× *Pathology*

How is the exam marked?

Candidates will receive two marks for each correct answer, one mark for an answer that is still correct but slightly less accurate and no marks for an incorrect answer. There is no negative marking; it is therefore important that you attempt every question.

The pass mark varies per sitting according to the difficulty of the exam and is determined by the Angoff method, which is a robust process by which the score at which a person can be deemed to be competent is obtained.

Tips

If the question relates to one of a pair of structures (such as the left clavicle on an image which shows both), then the side must be included in the answer. If only one of the pair is shown then it is not necessary to include whether it is left or right. It is worth practicing doing this as it is easy to forget in the exam.

It is important to appreciate the difference between an epiphysis, an apophysis, and an accessory ossicle. Although all are secondary ossification centres, this answer would only gain one mark, as it is not fully correct. Answers should be in English (as opposed to Latin) and abbreviations of any kind should be avoided.

Physics

The exam lasts for 2 hours and consists of 40 stems each containing five true/false questions. Each correct answer earns one mark. There is no negative marking. Candidates are therefore advised to attempt each question.

What is covered?

The clinical radiology syllabus is published on the RCR website. The physics exam tests those aspects described in section 4.1 through to 4.21.

The physics of image production including digital and analogue x-ray production, CT, MRI, ultrasound, nuclear medicine, fluoroscopy, and breast imaging.

Radiation protection and safety as it applies to practice within the UK.

Tips

There are questions in the exam where all five of the answers are true, or all five are false. Do not assume that there must be a mixture of answers within one stem.

Many candidates underestimate this exam and do not undertake sufficient preparation to pass it. It is strongly advised to attempt a reasonable number of practice questions and to take the time to carefully go through any that you got wrong.

What is not covered?

Section 4.22, 4.23 and 4.24 of the curriculum.

Optical imaging, molecular imaging, functional imaging.

Final FRCR exam part 2A

The FRCR 2A exam has undergone various different re-imaginings seemingly to switch between an all-in-one format to a modular one and back again every few years. To focus on the positive points of the new format:

- Candidates to recover any lost ground in their weaker modules by over-performing in their stronger modules.
- It also affords trainees a welcome break between parts 1 and 2A during which time they can focus on day to day radiology rather than sitting exams every few months throughout the same time.
- Crossover subjects (for example congenital heart disease) need only be prepared once
- The all-in-one format is cheaper than the sum of the previous six modular exams

Some candidates do enjoy preparing for the FRCR 2A exam. Certainly, it is often when many trainees come to learn which areas they may wish to sub-specialise in by the enthusiasm with which they approach the various topics to hand. It should also be gratifying when some of the conditions studied for an exam are then encountered in the work environment.

We hope that our website will help candidates to practice and prepare for this exam.

General approach to answering single best answer questions.

The answer options will contain one single correct answer and several other distracting options. The question commonly asks for the 'single most likely' answer or 'which single statement is true'. In many SBA questions, several of the answers options are correct, but only one will be the 'best' answer.

It is generally a good idea to read the question first, which will allow you to see what the main emphasis of the question is. Then scan the answers, so that you know what particular kind of answer is required. Finally, read the statement or scenario at the start of the question.

Within the statement or scenario, there will be many useful clues to point you towards the correct answer. It is worthwhile highlighting or underlining these clues while reading the scenario. Some scenarios will include clues such as examination findings and/or results or imaging findings. Try to highlight anything that is abnormal.

In addition to the correct answer, each SBA will usually contain at least one or two answers that are highly unlikely or obviously wrong. Then there are often one or two answers that are plausible and these serve as the main distracters within the

question. Cross out and eliminate the answers that are obviously incorrect so that you have narrowed your choices.

A good way of practicing SBA questions in the run-up to an exam is to cover up the list of answers and attempt to formulate an answer without the answers to guide you. By attempting to remember key facts from your memory in this way you can augment your ability to recall the information later.

This strategy is not recommended in the exam though, as on the day itself you will need every advantage that you can get!

Some SBAs require multiple cognitive steps in order to reach the correct answer. These sorts of questions are used to discriminate the best candidates. Typically you will be required to make a diagnosis and choose an answer based on this diagnosis.

If time allows, review the questions and answers again after finishing the exam, as it is possible that you may have misread some questions on the first attempt. When you are unsure of an answer, it is usually best to stick to your first instinct and not be tempted to change the answer on re-reading.

Preparing for the final FRCR part 2A exam

To build up a good knowledge base from which to answer the questions takes a great deal of time and candidates should start preparing at least six months before the exam. A robust textbook covering each of the areas should be used and should form the basis of your initial revision.
Some of the more commonly used textbooks in the UK are:

- Weissleder - Primer of Diagnostic Imaging
- Brandt & Helms Fundamentals of Diagnostic Radiology
- Grainger and Allison's Diagnostic Radiology Essentials
- The Requisites series

Once you have started to get to grip with the basics of each topic, it is a good idea to start to supplement your learning with regular SBAQ practice using resources such as our www.frcrexamprep.co.uk and any of the various question books available.

Questions are often based on one of two formats: common presentations of uncommon problems or uncommon presentations of common problems. Additionally, rare diseases, the likes of which you may never encounter in your professional careers, are over-represented in exams.

Try to isolate areas of weakness and concentrate on these areas and spend less time on your areas of strength. Many candidates struggle with the vast size of the syllabus and often need to focus on a module with which they are less content. It is a good idea to use your performance in SBAQs as a benchmark of your knowledge base in each area of the curriculum and use this as a means to support your revision planning. By the time each of you has qualified as a doctor, you will already have sat numerous exams and developed your own methods for preparing. It is a good idea to keep using the revision methods that you are used to when preparing for this exam. It is very important not to underestimate the amount of work that is required and spend plenty of time preparing!

Essential revision topic checklist for the Final FRCR part 2A exam

This is not designed to be an exhaustive list but rather a list of high yield topics that have appeared in previous exams and should form an essential part of your revision:

Cardiothoracic and Vascular

Chest

- CXR anatomy
- Halo sign
- Nodule follow up
- Lobar collapse
- Pneumonia
  - Streptococcal
  - Staphylococcal
  - Pseudomonas
  - Legionnaire disease
  - Haemophilus
  - Mycoplasma
  - Klebsiella
  - Tuberculosis
  - Mycobacterium avium intracellulare
  - Actinomycosis
  - Viral
  - Varicella zoster
  - Histoplasmosis
  - Aspergillosis
  - Cryptococcus
  - Candidiasis
- AIDs
  - Kaposi sarcoma
  - Lymphoma
  - Opportunistic infections
  - Pneumocystis jirovecii
- Relapsing polychondritis
- Mounier-Kuhn disease
- Chronic obstructive pulmonary disease
- Emphysema
- Alpha-1-antitrypsin deficiency
- Asthma

- Bronchiectasis
- Hydatid disease
- Pneumothorax
- Lung contusions and lacerations
- Diaphragmatic rupture
- Fat embolism
- Post-pneumonectomy changes
- Lung transplantation and complications
- Acute respiratory distress syndrome
- Pleural effusions
- Miliary disease
- Cavitation
- Pleural calcification
- Lung cancer
    - Adenocarcinoma
    - Squamous cell carcinoma
    - Bronchogenic carcinoma
    - Small cell carcinoma
    - Malignant mesothelioma
    - Carcinoid
    - Hamartoma
    - Carney triad
    - Pancoast tumour
    - Endobronchial lesions
    - Lymphangitis carcinomatosa
    - Metastases
    - Paraneoplastic syndrome
    - Radiation pneumonitis
- Post-pneumonectomy changes
- Interstitial lung disease
    - Cryptogenic organising pneumonia
    - Idiopathic pulmonary fibrosis
    - Non-specific interstitial pneumonitis
    - Respiratory bronchiolitis associated interstitial lung disease
    - Desquamative interstitial pneumonia
    - Acute interstitial pneumonia
    - Sarcoidosis
    - Lymphangioleiomyomatosis
    - Lymphoid interstitial pneumonitis
    - Collagen vascular diseases

        - Lung fibrosis by zone
        - Wegner granulomatosis
        - Churg-strauss syndrome
        - Goodpasture syndrome
        - Langerhans cenll histiocytosis
        - Idiopathic pulmonary haemorrhage
        - Amyloidosis
        - Neurofibromatosis
        - Drug induced lung disease
        - Alveolar proteinosis
    - Inhalational lung disease
        - Silicosis
        - Alveolar microlithiasis
        - Coal worker pneumoconiosis
        - Progressive massive fibrosis
        - Asbestosis
        - Hypersensitivity pneumonitis
        - Pulmonary infiltrations with eosinophilia
    - Sickle cell anaemia

Cardiac/mediastinum

- Atrial myxoma
- Carney syndrome
- Malignant cardiac lesions
- Thymoma
- Thymolipoma
- Teratoma
- Germ cell tumours
- Hodgkin disease
- Non-Hodgkin lymphoma
- Bronchopulmonary foregut malformations
- Castleman disease
- Fibrosing mediastinitis
- Extramedullary haematopoiesis
- Mitral stenosis
- Mitral regurgitation
- Aortic stenosis
- Aortic regurgitation
- Left atrial enlargement

- Myocardial perfusion studies
- Myoview scanning
- Cardiac MRI – hyperenhancement patterns
- Myocardial infarction
- Myocardial aneurysm
- Cardiomyopathy
- Hypertrophic obstructive cardiomyopathy
- Arrhythmogenic right ventricular dysplasia
- Coronary artery anomalies
- Coronary artery disease
- Pericardial effusion
- Pericardial cysts
- Takotsubo cardiomyopathy

Vascular

- Pulmonary artery hypertension
- Pulmonary venous hypertension
- Chronic thrombo-embolic pulmonary hypertension
- Deep vein thrombosis
- Pulmonary embolism
- V/Q scan
- Takayasu aortitis
- Polyarteritis nodosa
- Arterio-venous malformation
- Aortic arch anomalies
- Mycotic aneurysm
- Aneurysm screening programme
- Acute aorta
- Superior vena cava obstruction
- Subclavian steal syndrome
- Pulmonary sequestration
- EVAR endoleaks
- Persistent left superior vena cava
- Thoracic aortic aneurysm
- Thoracic lymphatic duct
- Pseudolipoma of the inferior vena cava
- Splenic artery aneurysm
- Popliteal artery entrapment syndrome
- Popliteal aneurysm

- Paget-Schroetter syndrome
- Hypothenar-Hammer syndrome

Interventional radiology

- Lung biopsy
- Angiography complications
- Pseudoaneurysm
- Carbon dioxide angiography
- Uterine artery embolisation
- Post-embolisation syndrome
- Radiofrequency ablation
- Cryoablation
- Transjugular intrahepatic porto-systemic shunt
- Renal artery stenosis
- Fibromuscular dysplasia
- Inferior vena cava filter
- Thrombolysis

Paediatrics

- Swyer-James syndrome
- Poland syndrome
- Congenital heart disease
  - VSD, ASD, PDA
  - Eisenmenger syndrome
  - Partial anomalous pulmonary venous circulation
  - Total anomalous pulmonary venous circulation
  - Pulmonary stenosis
  - Congenital aortic stenosis
  - Coarctation of the aorta
  - Tetralogy of Fallot
  - Ebstein anomaly
  - Tricuspid atresia
  - Tranposition of the great arteries
  - Situs inversus
  - Hypoplastic left heart syndrome
- Kawasaki disease
- Epiglottitis
- Croup
- Retropharyngeal abscess

- Mediastinal cysts
- Thymus
- Hyperlucent lung
- Congenital lobar overinflation
- Foreign body
- Congenital pulmonary airway malformation
- Pulmonary hypoplasia
- Bronchial atresia
- Congenital diaphragmatic hernia
- Kartagener syndrome
- Cystic fibrosis
- Pneumonias
- Round pneumonia
- Neonatal respiratory distress
    - Hyaline membrane disease
    - Transient tachypnoea of the newborn
    - Meconium aspiration
    - Neonatal pneumonia
    - Pulmonary interstitial emphysema
    - Bronchopulmonary dysplasia
    - Mikity syndrome
- Langerhans cell histiocytosis

Musculoskeletal and trauma

Tumours

- Bone forming 'osteo-'
  - Neoplastic
    - Osteoid osteoma
    - Osteoblastoma
    - Osteosarcoma
    - Enostosis
  - Non-neoplastic
    - Osteopoikilosis
    - Osteopathia striata
    - Osteopetrosis
    - Pyknodysostosis
    - Melorheostosis
- Cartilage forming 'chondro-'
  - Enchondroma
    - Enchondromatosis (Ollier disease + Maffucci syndrome)
  - Osteochondroma
    - Bizarre parosteal osteochondromatous proliferation (BPOP)
  - Dysplasia Epiphysealis Hemimelica (Trevor disease)
  - Chondroblastoma
  - Chondromyxoid fibroma
  - Chondrosarcoma
- Fibrous tumours 'fibro-'
  - Fibrous cortical defect
  - Non-ossifying fibroma
  - Ossifying fibroma
  - Desmoid
  - Malignant fibrous histiocytoma (Fibrosarcoma)
- Bone marrow
  - Langerhans cell histiocytoma (Eosinophilic granuloma)
  - Multiple myeloma
  - POEMS
  - Ewing sarcoma
- Others
  - Unicameral bone cyst (Simple bone cyst)
  - Aneurysmal bone cyst
  - Haemophilic pseudotumour

        - Giant cell tumour
        - Intraosseous haemangioma
        - Adamantinoma
        - Chordoma
        - Intraosseous lipoma
        - Myositis ossificans
        - Tumoral calcinosis
    - Soft tissue masses
        - Fibroma of the tendon sheath
        - Maligant fibrous histiocytoma
        - Pigmented villonodular synovitis
        - Nerve tumours
        - Sarcoma
        - Glomus tumour
        - Gorlin syndrome

Arthritides

- Degenerative
    - General
    - Erosive
    - Disc disease
    - DISH (Forester disease)
- Inflammatory
    - Autoimmune
        - Rheumatoid arthritis
        - Scleroderma
        - Systemic Lupus Erythematous
        - Dermatomyositis
    - Seronegative
        - Ankylosing spondylitis
        - Psoriatic arthritis
        - Inflammatory bowel disease related
    - Metabolic
        - Gout
        - Calcium pyrophosphate deposition (CPPD)
        - Hereditary haemochromatosis
        - Wilson disease
        - Milwukee shoulder
        - Alkaptonuria

        - Amyloid
        - Haemophilia
    - Infection
        - Septic
        - Tuberculous
        - Charcot
        - SAPHO

Metabolic bone disease

- Osteopenia
- Osteoporosis
- Osteomalacia
- Renal osteodystrophy
- Rickets
- Scurvy
- Alkaptonuria (Ochronosis)

Endocrine bone disease

- Hyperparathyroidism
- Acromegaly

Bone marrow disease

- Gaucher disease
- Sickle cell disease
- Thalassaemia
- Myelofibrosis
- Paget disease
- Osteonecrosis

Paediatrics

- Degenerative/chronic
    - Developmental dysplasia of the hip
    - Perthes disease
    - Slipped upper femoral epiphysis (SUFE)
    - Achondroplasia
    - Downs syndrome
    - Neurofibromatosis
    - Haemophilia

        - Marfan syndrome
        - Nail-Patella syndrome
        - Cleidocranial dysostosis
        - Talipes equinovarus
        - Tarsal coalition
    - Congenital
        - Dwarfism
        - Chondroplasia
        - Osteogenesis imperfecta
        - Mucopolysaccharidosis
        - Craniocleido dysostosis
        - Holt-Oram disease
        - Caffey disease
        - Scoliosis
    - Trauma
        - General
        - Salter-Harris classification
        - Osteochondritis dessicans
        - Avulsion fractures
    - Infection
        - Haematogenous osteomyelitis
        - Chronic osteomyelitis
        - Congenital
            - Rubella
            - Syphilis

Trauma

- Fractures
- Spine
- Face
- Upper limb
    - Shoulder dislocation
    - SLAP
    - Adhesive capsulitis
    - Wrist dislocations
    - Carpal instability
- Lower limb
    - Osteochondritis dessicans
    - Patella dislocation

        - Meniscal injuries
        - Cruciate injuries
    - Soft tissue
        - DOMS
        - Muscle hernia
        - Haematoma
        - Ganglion cyst
        - Plantar fibromatosis
        - Synovial osteochondromatosis
        - Popliteal entrapment syndrome

Gastro-intestinal

Upper GI

- Barium studies
- GORD + Hiatus hernia
- Oesophagitis
- Plummer-Vinson syndrome
- Zenker Diverticulum
- Ulcers
- Oesophageal cancer
- Scleroderma
- Chagas disease
- Oesophageal intramural pseudodiverticulosis
- Menetriers disease
- Zollinger-Ellinson
- Gastric volvulus
- Pyloric stenosis
- Phytobezoar
- Gastric cancer
- Crohns disease
- Coeliac disease
- Carcinoid
- Multiple endocrine neoplasia
- Infections
- Opportunistic infections
- Typhilitis
- Radiation enteritis
- Mesenteric ischaemia
- Superior mesenteric artery syndrome
- Meckel diverticulum
- Systemic sclerosis
- Whipple disease
- Mastocytosis
- Hernias
- Graft vs Host disease
- Appendicitis

Lower GI

- Barium studies
- Polyps
- Polyposis syndromes
- Colorectal cancer
- Diverticulitis
- Epiploic appendagitis
- Aphthoid ulcers
- Inflammatory colitis
- Infectious colitis
- Ischaemic colitis
- Lower GI bleeding
- Angiodysplasia
- Behcet syndrome
- Toxic megacolon
- Volvulus
- Intussusception
- Hirschsprung disease
- Rectal cancer
- Tailgut duplication cyst
- Pelvic lipomatosis
- Perianal fistulae

Peritoneum, mesentry, omentum

- Ascites
- Sclerosing mesenteritis
- Fibrosing peritoneal disease
- Mesothelioma
- Pseudomyxoma peritonii
- Malrotation

Hepatobiliary

- Liver biopsy
- Radiofrequency ablation
- Transjugular intrahepatic portosystemic shunt
- Liver Doppler
- Fatty infiltration
- Cirrhosis
- Haemochromatosis
- Wilson disease
- Primary biliary cirrhosis
- Metastases
- Cysts
- Abscesses
- Haemangioma
- Focal nodular hyperplasia
- Hepatic adenoma
- Regeneration nodules
- Hepatocellular carcinoma
- Hepatoblastoma
- Cholangiocarcinoma
- Budd-Chiari syndrome
- Congenital biliary atresia
- Liver transplant
- HELLP syndrome
- Gallstones
- Cholecystitis
- Porcelain gallbladder
- Adenomyomatous hyperplasia
- Mirizzi syndrome
- Cholesterolosis
- Xanthogranulomatous cholecystitis
- Parasites
- Cystic disease – Caroli disease
- Sphincter of Oddi dysfunction
- Annular pancreas
- Cystic fibrosis
- Hereditary haemorrhagic telangiectasia
- Von Hippel Lindau syndrome
- Pancreatitis
- Pancreatic carcinoma

- Intraductal papillary mucinous neoplasm
- Islet cell tumour
- Splenic trauma

Paediatrics

- HIV parotitis
- Duodenal atresia
- Annular pancreas
- Duplication cyst
- Neonatal xray – lines and tubes
- Tracheo-oesophageal fistula
- VACTERL
- Hypertrophic pyloric stenosis
- Gastric volvulus
- Gastroscisis
- Omphalocoele
- Malrotation
- Midgut volvulus
- Non-rotation
- Hirschsprung disease
- Meconium ileus
- Meconium plug syndrome
- Meconium peritonitis
- Intussusception
- Meckel diverticulum
- Appendicitis
- Necrotising enterocolitis
- Biliary atresia
- Haemangioendothelioma
- Hepatoblastoma
- Hepatocellular carcinoma
- Rhabdomyosarcoma of the biliary tree
- Non-Hodgkin lymphoma
- Choledochal cyst
- Wilson disease
- Budd-Chiari syndrome

Genito-urinary, Adrenal, Obstetrics & Gynaecology, Breast

Renal

- Anomalies
  - Duplex systems
  - Foetal lobulation
  - Column of Bertin
- Vesicoureteric reflux
- Renal papillary necrosis
- Glomerulonephritis
- Pyelonephritis
- Xanthogranulomatous pyelonephritis
- Emphysematous pyelonephritis
- HIV related nephropathy
- Renal tuberculosis
- Alkaptonuria
- Renal cysts
- Adult polycystic kidney disease
- Hydatid cysts
- Von Hippel-Lindau syndrome
- Renal abscess
- Malacoplakia
- Angiomyolipoma
- Metastases
- Oncocytoma
- Renal Cell Carcinoma
- Transitional Cell Carcinoma
- Retroperitoneal fibrosis
- Renal lacerations
- Renal artery stenosis
- Fibromuscular dysplasia
- Renal vein thrombosis
- Renal transplantation and complications
- Contrast nephropathy
- Nephrogenic systemic fibrosis
- Nuclear medicine scans
- Nephrocalcinosis
- Medullary sponge kidney

Urology

- Urachal remnant
- Schistosomiasis
- Prostate cancer
- Prostatitis
- Benign prostatic hypertrophy
- Fournier gangrene
- Ureteric obstruction
- Ureteric calculi
- Saddle injuries
- Testicular tumours
  - Seminoma
  - Azzopardi tumour
  - Non-seminomatous germ cell tumours
  - Non germ cell tumours
  - Lymphoma
  - Metastases
- Epidermoid cyst
- Scrotal trauma
- Epididymo-orchitis
- Tubular ectasia
- Intratesticular cyst
- Testicular microlithiasis
- Varicocoele
- Spermatocoele

Adrenal

- Cushing syndrome
- Conn syndrome
- Phaeochromocytoma
- MIBG scans
- Multiple Endocrine Neoplasia
- Adrenal adenoma
- Adrenocortical carcinoma
- Adrenal myelolipoma
- Adrenal incidentaloma
- Adrenal calcification
- Adrenal haemorrhage

Obstetrics & Gynaecology

- Bartholin gland cysts
- Urethral diverticulae
- Nabothian cysts
- Gartner duct cysts
- Skene duct cysts
- Infertility
- Tubal disease
- Gestation
- Ectopic pregnancy
- Multiple pregnancies
- Placenta accrete
- HSG
- Mullerian duct anomalies
- Mayer-Rokitansky-Kuster-Hauster syndrome
- Fibroids
- Adenomyosis
- Endometriosis
- Endometrioma
- Endometrial polyp
- Endometrial carcinoma
- Gestational trophoblastic disease
- Carcinoma of the cervix
- Theca Lutein cysts
- Ovarian vein thrombosis
- Tuberculosis
- Polycystic ovarian syndrome
- Ovarian torsion
- Ovarian mature teratoma
- Endometrioid tumour
- Granulosa cell tumours
- Ovarian fibroma
- Fibrothecoma
- Ovarian carcinoma

Breast

- Screening
- Breast cancer
  - Invasive ductal carcinoma
  - Medullary carcinoma
  - Paget disease of the nipple
  - Infiltrating carcinoma
  - Mucinous carcinoma
  - Phyllodes tumouer
  - Papillary carcinoma
  - Hamartoma
  - Metastases
- Mondor disease
- Breast cysts
- Radial scar
- Duct ectasia
- Galactocoele
- Gynaecomastia
- Fibroadenoma
- Fibrocystic change of the breast
- Mammoplasty
- Breast MRI

Paediatrics

- Multicystic dysplastic kidney
- Nephroblastomatosis
- Wilms tumour
- Renal lymphangiectasia
- Mesoblastic nephroma
- Primary adrenal neuroblastoma
- Adrenal cortical carcinoma
- Congenital adrenal hyperplasia
- Neonatal adrenal haemorrhage
- Autosomal recessive kidney disease
- Alport syndrome
- Henoch-Schonlein purpura
- Hemolytic-uraemic syndrome
- Posterior urethral valves
- Vesico-ureteric reflux
- Cryptorchidism

- Testicular torsion
- Ureterocoele
- Megaureter
- Recurrent urinary tract infections
- Circumcaval ureter
- Bladder exstrophy-epispadia complex
- Mayer-Rokitansky-Kuster-Hanser syndrome
- Haematometrocolpos
- Sacrococcygeal teratoma
- Prune-belly syndrome
- Meckel Gruber syndrome
- Amputated ovary
- Renal vein thrombosis

Interventional radiology

- Nephrostomies
- Ureteric stents
- Renal biopsies
- PCNL
- Cryoablation
- Varicocoele embolisation
- Uterine artery embolisation

Paediatrics
(these are also listed in their relevant specialties)

Cardiothoracic and vascular

- Swyer-James syndrome
- Poland syndrome
- Congenital heart disease
  - VSD, ASD, PDA
  - Eisenmenger syndrome
  - Partial anomalous pulmonary venous circulation
  - Total anomalous pulmonary venous circulation
  - Pulmonary stenosis
  - Congenital aortic stenosis
  - Coarctation of the aorta
  - Tetralogy of Fallot
  - Ebstein anomaly
  - Tricuspid atresia
  - Tranposition of the great arteries
  - Situs inversus
  - Hypoplastic left heart syndrome
- Kawasaki disease
- Epiglottitis
- Croup
- Retropharyngeal abscess
- Mediastinal cysts
- Thymus
- Hyperlucent lung
- Congenital lobar overinflation
- Foreign body
- Congenital pulmonary airway malformation
- Pulmonary hypoplasia
- Bronchial atresia
- Congenital diaphragmatic hernia
- Kartagener syndrome
- Cystic fibrosis
- Pneumonias
- Round pneumonia
- Neonatal respiratory distress
  - Hyaline membrane disease
  - Transient tachyponoea of the newborn

        - Meconium aspiration
        - Neonatal pneumonia
        - Pulmonary interstitial emphysema
        - Bronchopulmonary dysplasia
        - Mikity syndrome
    - Langerhans cell histiocytosis

Muskuloskeletal and trauma

- Degenerative/chronic
    - Developmental dysplasia of the hip
    - Perthes disease
    - Slipped upper femoral epiphysis (SUFE)
    - Achondroplasia
    - Downs syndrome
    - Neurofibromatosis
    - Haemophilia
    - Marfan syndrome
    - Nail-Patella syndrome
    - Cleidocranial dysostosis
    - Talipes equinovarus
    - Tarsal coalition
- Congenital
    - Dwarfism
    - Chondroplasia
    - Osteogenesis imperfecta
    - Mucopolysaccharidosis
    - Craniocleido dysostosis
    - Holt-Oram disease
    - Caffey disease
    - Scoliosis
- Trauma
    - General
    - Salter-Harris classification
    - Osteochondritis dessicans
    - Avulsion fractures

- Infection
  - Haematogenous osteomyelitis
  - Chronic osteomyelitis
  - Congenital
    - Rubella
    - Syphilis

Gastrointestinal

- HIV parotitis
- Duodenal atresia
- Annular pancreas
- Duplication cyst
- Neonatal xray – lines and tubes
- Tracheo-oesophageal fistula
- VACTERL
- Hypertrophic pyloric stenosis
- Gastric volvulus
- Gastroscisis
- Omphalocoele
- Malrotation
- Midgut volvulus
- Non-rotation
- Hirschsprung disease
- Meconium ileus
- Meconium plug syndrome
- Meconium peritonitis
- Intussusception
- Meckel diverticulum
- Appendicitis
- Necrotising enterocolitis
- Biliary atresia
- Haemangioendothelioma
- Hepatoblastoma
- Hepatocellular carcinoma
- Rhabdomyosarcoma of the biliary tree
- Non-Hodgkin lymphoma
- Choledochal cyst
- Wilson disease
- Budd-Chiari syndrome

Genitourinary, adrenal, obstetrics & gynaecology and breast

- Multicystic dysplastic kidney
- Nephroblastomatosis
- Wilms tumour
- Renal lymphangiectasia
- Mesoblastic nephroma
- Primary adrenal neuroblastoma
- Adrenal cortical carcinoma
- Congenital adrenal hyperplasia
- Neonatal adrenal haemorrhage
- Autosomal recessive kidney disease
- Alport syndrome
- Henoch-Schonlein purpura
- Hemolytic-uraemic syndrome
- Posterior urethral valves
- Vesico-ureteric reflux
- Cryptorchidism
- Testicular torsion
- Ureterocoele
- Megaureter
- Recurrent urinary tract infections
- Circumcaval ureter
- Bladder exstrophy-epispadia complex
- Mayer-Rokitansky-Kuster-Hanser syndrome
- Haematometrocolpos
- Sacrococcygeal teratoma
- Prune-belly syndrome
- Meckel Gruber syndrome
- Amputated ovary
- Renal vein thrombosis

Central nervous and head & neck

- Vein of Galen arteriovenous malformation
- Congenital rubella
- Chiari malformation
- Encephalocoele
- Agenesis of the corpus callosum
- Holoprosencephaly
- Schizencephaly
- Porencephaly

- Dandy-Walker malformation
- Friedreich ataxia
- ADEM
- Herpes simplex enephalitis
- Neurosarcoid
- Subdural empyema
- Spine ultrasound
- Congenital toxoplasmosis
- Congenital CMV
- Periventricular leukoencephalopathy
- Germinal matrix haemorrhage
- Intracranial haemorrhage
- Hypoxic ischaemic encephalopathy
- Congenital hydrocephalus
- Normal myelination
- Cervical spine on x-ray
- Pseudosubluxation of the cervical spine
- Pilocytic astrocytoma
- Cerebellar astrocytoma
- Intramedullary astrocytoma
- Choroid plexus papilloma/carcinoma
- PNET
- Epidermoid
- Dermoid
- Ependymoma
- DNET
- Craniopharyngioma
- Hypothalamic glioma
- Adrenoleukodystrophy
- Axial telangiectasia
- Sturge-Weber syndrome
- Congenital cholesteatoma
- Retinoblastoma
- Hyperplastic primary vitreous
- Cephalhaematoma
- Craniosynostosis
- Widened sutures
- Wormian bones
- Cord tethering
- Juvenile angiofibroma

- Antrochoanal polyp
- Ranula
- Cystic hygroma
- Branchial cleft cyst

Central nervous and Head & Neck

Neurology

- Cavum variants
- Meningeal enhancement patterns
- Ring enhancing lesions
- Normal intracranial enhancement
- Diffusion weighted imaging
- CT perfusion imaging
- Spectroscopy
- NICE head guidelines
- Neurosarcoid
- Wegner granulomatosis
- Cerebral lupus
- Posterior reversible leukoencephalopathy
- Vascular
    - Catheter angiography complications
    - Carotid dissection
    - Vascualar territories
    - Carotid Doppler
    - Vertebrobasilar arteries
    - Jugular foramen
    - Cavernous sinus
    - Intracranial haemorrhage
        - Hypertensive haemorrhage
        - Tumour haemorrhage
        - Subarachnoid haemorrhage
        - Intracranial aneurysm
        - MRA
        - Siderosis
    - Arteriovenous malformation
    - Spinal AVM
    - Spinal dural AVF
    - Capillary telangiectasia
    - Cavernoma
    - Developmental venous anomaly
    - Artery of Percheron
    - Moyamoya disease
    - CADISIL
    - Amyloid andiopathy

        - Venous sinus thrombosis
    - Basal ganglia calcification
    - Normal intracranial calcification
    - Infarction
        - Acute infarction
        - Lacunar infarction
        - Basilar stroke
        - Lateral medullary syndrome
        - Spinal cord infarction
        - Venous infarction
    - Trauma
        - Glasgow coma scale
        - Extradural haematoma
        - Subdural haematoma
        - Diffuse axonal injury
        - Cortical contusion
        - Cerebral herniation
        - Diffuse cerebral oedema
        - Arterial dissection
        - Caroticocaval fistula
        - Traumatic nerve root avulsion
        - Skull base fracture
    - Neoplasia / intracranial lesions
        - Intra-axial vs extra-axial
        - Vasogenic oedema vs cytotoxic oedema
        - Astrocytoma
        - Glioblastoma multiforme
        - Pleomorphic xanthoastrocytoma
        - Brainstem glioma
        - Hypothalamic glioma
        - Pilocytic astrocytoma
        - Oligodendroglioma
        - Ependymoma
        - Subependymoma
        - Gliomatosis cerebri
        - Choroid plexus papilloma/carcinoma
        - Meningioma
        - Malignant meningioma
        - Haemangioblastoma
        - Cyst with a mural nodule

        - DNET
        - Central neurocytoma
        - PNET
        - Medulloblastoma
        - Ganglioglioma
        - Schwannoma
        - Cerebellopontine angle tumours
        - Hypothalamic hamartoma
        - Germinoma
        - Pineal tumours
            - Pineoblastoma
            - Pineocytoma
            - Teratoma
        - CNS lymphoma
        - Radiation induced leukoencephalopathy
        - Metastases
        - Limbic encephalitis
        - Carcinomatous meningitis
        - Arachnoid cyst
        - Epidermoid
        - Dermoid
        - Leptomeningeal cyst
        - Colloid cyst
        - Rathke cleft cyst
    - Degenerative and white matter diseases
        - Normal aging
        - Multiple sclerosis
        - ADEM
        - Central pontine myelinolysis
        - Carbon monoxide poisoning
        - Leukodystrophies
            - Adrenoleukodystrophy
            - Canavan disease
        - Alzheimer disease
        - Pick disease
        - Vascular dementia
        - Parkinson disease
        - Creutzfeld-Jakob disease
        - Wernicke encephalopathy
        - Subacute combined degeneration of the cord

        - Huntington chorea
        - Wilson disease
        - Eye of the tiger sign
        - Hallervoden-Spatz syndrome
        - Cerebellar atrophy
        - Mesial temporal sclerosis
        - Progressive multifocal leukoencephalopathy
    - Hydrocephalus
        - Communicating
        - Non-communicating
        - Normal pressure hydrocephalus
    - Spontaneous intracranial hypotension
    - Infections
        - Bacterial meningitis
        - CNS tuberculosis
        - Empyema
        - Intracerebral abscess
        - Cryptococcus
        - Neurocisticercosis
        - Lyme disease
        - Herpes simplex encephalitis
        - Japanese encephalitis
        - Toxoplasmosis
        - Neurosyphilis
        - HIV encephalitis
        - CMV encephalitis
    - Phakomatoses
        - Neurofibromatosis
        - Von Hippel-Lindau
        - Tuberous sclerosis
        - Sturge-Weber syndrome
        - Axial telangiectasia
    - Sella/juxtasella
        - Pituitary macroadenoma
        - Non-functioning macroadenoma
        - Craniopharyngioma
        - Sheehan syndrome
        - Autoimmune hypophysitis
        - Suprasellar lesions

Spine

- Intramedullary vs extramedullary spinal lesions
- Plexiform neurofibroma
- Paraganglioma of the spine
- Spinal ependymoma
- Spinal astrocytoma
- Spinal haemangioblastoma
- Synovial cyst
- Drop metastases
- Endplate disease
- Disc herniation
- Diffuse idiopathic skeletal hyperostosis
- Spinal dysraphism
- Syringohydromyelia
- Diastematomyelia
- Tethered spinal cord
- Spondylitis
- Discitis
- Spinal tuberculosis
- Arachnoiditis

Head and neck

- Ear
  - Superior semicircular canal dehiscence
  - Meniere disease
  - Cholesteatoma
  - Gradenigo syndrome
  - Cholesterol granuloma
  - Keratosis obturans
  - Cochlear otosclerosis
  - Persistent stapedial artery
  - Malignant otitis externa
  - Aberrant internal carotid artery
  - Temporomandibular joint dysfunction
  - Bell palsy
  - Tolosa-Hunt syndrome
- Nose
  - Sinus anatomy
  - Choanal atresia
  - Juvenile angiofibroma

        - Sinus mucocoele
        - Sinonasal polyposis
        - Fungal sinusitis
    - Neck and throat
        - Glomus tumour
        - Carotid body tumour
        - External carotid artery
        - Oral/pharyngeal squamous cell carcinoma
        - Laryngeal carcinoma
        - Thornwaldt cyst
        - Thyroglossal duct cyst
        - Ectopic thyroid tissue
        - Sialolithiasis
        - Pleomorphic adenoma
        - Mucoepidermoid carcinoma
        - Thyroid cancer
        - Dentigerous cyst
        - Gorlin-Goltz syndrome
        - Pyknodysostosis
        - Ameloblastoma
        - Cementoma
        - Cherubism
        - Brown tumour
        - Giant cell granuloma
        - Parathyroid adenoma
        - Retropharyngeal abscess
        - Croup
        - Supraglottitis
        - Deep spaces of the neck
        - Le Fort fractures
        - Petrous temporal bone fractures
        - McCune-Albright syndrome
    - Eye
        - Retinoblastoma
        - Leukocoria
        - Optic melanoma
        - Optic nerve glioma
        - Optic nerve sheath meningioma
        - Coloboma
        - Thyroid eye disease

- Orbital pseudotumour
- Hashimoto thyroiditis
- Optic drusen
- Optic tracts
- Venous lymphatic malformation

Paediatrics

- Vein of Galen arteriovenous malformation
- Congenital rubella
- Chiari malformation
- Encephalocoele
- Agenesis of the corpus callosum
- Holoprosencephaly
- Schizencephaly
- Porencephaly
- Dandy-Walker malformation
- Friedreich ataxia
- ADEM
- Herpes simplex enephalitis
- Neurosarcoid
- Subdural empyema
- Spine ultrasound
- Congenital toxoplasmosis
- Congenital CMV
- Periventricular leukoencephalopathy
- Germinal matrix haemorrhage
- Intracranial haemorrhage
- Hypoxic ischaemic encephalopathy
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- Choroid plexus papilloma/carcinoma
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- Epidermoid
- Dermoid

- Ependymoma
- DNET
- Craniopharyngioma
- Hypothalamic glioma
- Adrenoleukodystrophy
- Axial telangiectasia
- Sturge-Weber syndrome
- Congenital cholesteatoma
- Retinoblastoma
- Hyperplastic primary vitreous
- Cephalhaematoma
- Craniosynostosis
- Widened sutures
- Wormian bones
- Cord tethering
- Juvenile angiofibroma
- Antrochoanal polyp
- Ranula
- Cystic hygroma
- Branchial cleft cyst

Final FRCR exam part 2B

The exam can be described as a marathon, not a sprint. Ideally, this exam should be prepared over at least 12 months. Up until this point, the examinations have all been written (either on paper or on a computer). The final part of the FRCR exam introduces a viva-style element.

There are three components to the part 2B:

1. Long cases
2. Rapid reporting
3. Viva

Candidates must pass all three at once in order to complete the exam.

Long cases:

6 cases. Each case may consist of multiple imaging sets. The candidate must write down a report for each image.

The biggest issue with this part of the exam is time. It is very important to stick to 8 minutes per case. If you have not finished, make bullet point notes and move onto the next case. Otherwise, you will run the risk of running out of time before even having viewed the last case and will, therefore, receive no marks for it. Practice doing this in your day to day working by timing yourself on cases you report, reporting them in 8 minutes and then going back over them in a more sedate manner as you please.

For each set of imaging look through all of the images you are presented with before reporting them. It may be that you cannot see the finding on a plain film, but it is very clearly shown on a cross-sectional study, which then enables you to better report the previous plain film. This exam is not like the viva; you will get no extra marks for having found the finding without the cross-sectional study so use every advantage you can. There will also be a limited amount of clinical information available so make sure if any is provided that you take this into account. It may well have been provided for a reason.

Try to stick to a reporting structure:

1. *Observation of findings* – positive and negative findings
2. *Interpretation* – Many candidates prefer to give findings and interpretations together as this is how they are set out in the demonstration questions on the RCR website.
3. *Main diagnosis*
4. *Relevant differential diagnoses* – these must be relevant to the case at hand, i.e., it is not necessary to list any differential diagnoses of the finding, which

would only be pertinent to a child if the patient is clearly an adult. Not all cases will have differential diagnoses. Try to limit your differential diagnoses to the top two or three for each case in order not to appear too indecisive. Some cases may be sufficiently clear not to need any differential diagnoses.

5. *Next steps in management* – such as additional tests recommended, details of who might need to be contacted with the findings, any relevant follow-up imaging. As you would in your normal practice, do not suggest anything which would be unnecessary or unduly invasive.

It is better to write reports in full sentences, but if you are running out of time, you can still score marks with bullet-pointed findings.

Try to be mindful of the investigations you have been given and what they might contribute to a unifying diagnosis. An example would be a fluoroscopic study showing Crohn's disease and a pelvic x-ray with sacroiliitis. Similarly, if you think you have identified the relevant diagnosis, actively search within the images for other features of the same disease. An example of this would be looking for a small meningioma on an image showing bilateral acoustic neuromas in a patient with neurofibromatosis type 2.

Rapid reporting:

30 images. The candidate must decide if the images are normal or abnormal, and name the abnormality.
Candidates can have one of two issues with this exam, overcalling and undercalling. Of these, most candidates who fail this component do so due to overcalling. If you are agonising over a finding and finding it difficult to decide, call the film normal. The abnormalities will be definite and indisputable therefore if you find yourself on the fence about something on the image it is probably normal.

It is in the candidate's interest to score highly in this part of the exam as it can act as a buffer against a tough viva. Candidates who score full marks in the rapid reporting can afford to drop a few marks in each of the vivas without failing the exam.

It is worth spending time during your working week doing more plain film reporting than you would usually be scheduled for. Rapid reporting relies on your ability to take in an image very quickly and come to a decision as to whether it is normal or abnormal. Candidates who struggle with this part of the exam are often found to have neglected their plain film reporting during their training. Try to get into the habit of reporting at least 100 plain films per week for the months leading up to the exam.

It is also worthwhile taking a look at Keats and Anderson's book of normal variants in the weeks leading up to the exam as many candidates can be caught out calling a finding abnormal when it is actually either a variant or an expected age-related change.

Viva:

This is often the part of the exam that candidates fear the most; the examiner can and will show you and ask anything they choose. The focus has shifted from knowledge of diagnoses required to pass the final FRCR part 2A, to differential diagnoses for potential findings.

There will be some cases which you are not expected to know the (usually very rare) diagnosis, but will be expected to demonstrate a logical and, above all, safe approach to the situation. This exam is all about proving that you are safe to practice independently as a consultant radiologist.

Preparing

During your day-to-day work, if you come across a potential viva topic try to recall everything you already know about it, write it down even. Once you have done that look up the topic and read up on anything you have left off.

Revising as part of a small group is ideal. Candidates are advised to use a reference guide such as Chapman and Nakielny's Aids to Radiological differential diagnosis as a foundation for their revision, but in the exam, candidates will be expected to give not the complete differential diagnosis for a given finding but rather the appropriate differential diagnosis for the patient that is shown. It is not sufficient, for example, to include in your answer differential diagnoses which only affect the paediatric patient if the patient in the image is clearly an adult.

If you work in a friendly department (and actually, even if you don't!) ask your consultant colleagues to viva you as often as you can both fit the time in. Even better, ask them if they have friends who are not known to you who would viva you; there's nothing so useful in viva practice as being grilled by a new person.

In the exam

Once you are in the exam, do everything in your power to stay calm. When the examiner shows you a film try to talk through your approach and thoughts in much the same way as you might overdo the action of looking in your mirrors during a driving test. It is important for the examiner to be able to follow your thought processes and it can buy you time. This applies particularly if you cannot see any

abnormality on the film. Talk through the image as if you were presenting it, checking off each normal structure systematically to demonstrate a robust method. Take in all the review areas and edges of the film in particular.
For a CT scan, it is a good idea to scroll quickly all the way from top to bottom of the stack of images to make sure that the finding is not on the very bottom few slices. Once you have done that, then return to the top and be systematic, as you would in your day-to-day reporting. This is akin to taking in the whole of a plain film to try to spot the obvious abnormality, before switching to a systematic approach.

For an MRI scan, you should name the sequences and state whether contrast has been given. For those for whom this does not come naturally, this may take some practice. For MSK exams it is sufficient to name the sequences as fluid-sensitive or fat-sensitive.

If there is pathology there and the examiner is feeling charitable, they may help you with a comment such as: 'review the bony skeleton'. In this case, you have been thrown a lifeline so don't squander it. Shift **down** a gear and search through each individual bone on the film one after the other, again demonstrating how methodical you are. This is very difficult to do in the heat of the moment because the adrenaline burst when you think you may have missed something is difficult to manage. Stay calm. Slow down. Stick to a method.

Once the image comes down force yourself to forget about it and move on to the next case. It is astonishing how many times candidates think they have failed on one case but actually it is the subsequent case they fail on because they are so preoccupied with the previous one! What is done is done. Put a 'bad' case behind you; you can still pass the exam with a bad case or two.