FRCR Part 1 – ORF Guidance Document

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1 Introduction

This guidance has been put together by members of the Oncology Registrars\-Forum (ORF) to try and provide practical and useful advice to registrars planning to take the Part 1 FRCR examinations. The advice offered should assist you in your efforts to plan your revision and is based on the experience of those who have gone before you!

Unlike the MRCP, which is the last group of exams that many of you will have taken, there are no dedicated large question banks to aid in revision. Therefore a slightly different strategy is required.

There are some key points that relate to all four of the modules:

- Start revising early and use the syllabus (Underpinning Scientific Knowledge) to focus your efforts.
- Use a variety of resources: textbooks, courses, websites, and colleagues.
- Refer also to the Reading List
- Previous Examiners\-Reports on the RCR website provide useful guides to areas of the syllabus less well covered by candidates, and can help focus revision. The examiners are not out to trick you, but want to test your understanding of the syllabus.
- We would advise finding out about relevant courses that are available in your departments and regions as soon as possible.

If possible, we would advise taking all four modules together at your first sitting. This ensures the maximum number of attempts at each module but also helps rationalise your revision because there is some overlap in topics between the modules.

There are several good courses available to aid in preparation for the exams. We have not included details of specific courses, but we would advise you to speak to your colleagues and your local ORF representative as soon as possible to work out which courses are particularly recommended.

We wish you the best of luck!

Please note:

Comments on courses and other learning resources below are the views of the authors only and are not meant to be exhaustive – there are likely to be many other useful resources that your colleagues can point you towards. Comments are certainly not meant as advertisements.

All of what is written here are the views of the authors and are not endorsed by the FRCR examiners.

This document is, in part, based on a local guidance document produced by Dr Sundus Yahya and Dr Andrea Stevens of the West Midlands Training Scheme.
2 Cancer Biology and Radiobiology

2.1 General Approach

Initially this module can seem daunting given the breadth of topics, however the exam generally focuses on clinically relevant or fundamental principles so putting in the work is well worth it. The key is to start early, as cramming the more conceptual topics such as the linear quadratic equation and DNA repair pathways won't be easy.

The exam will cover a broad range of areas, and ensuring you comprehend key principles from the exam syllabus is invaluable. For radiobiology there will likely be more than one question on alpha beta ratios, oxygenation and dose fractionation so aim to understand the key concepts well. There are likely to be a few calculation questions e.g. using BED or EQU2.

A lot of work will involve reading textbooks and making revision notes. Using the syllabus as a guide and working through the topics is a good way to consolidate your learning, particularly to avoid getting lost in the vast field of cancer biology.

2.2 Resources

Websites: The best (free) web resource is from ASTRO. There are 5 past examinations available (https://www.astro.org/ARRO/Resident-Resources/Certification-Resources/Physics-and-Radiation-Biology-Curriculum/Index.aspx) that offer excellent explanations, so it's worth using these quite early on. They are particularly good for radiobiology, but also cover cancer biology, and a small amount of physics. There is also a series of good radiobiology lectures available (audio and slides - https://www.astro.org/ARRO/Resident-Resources/Educational-Resources/Radiobiology-Lectures/index.aspx).

There are some older format (written answer) questions on the RCR website which give an idea on the topics likely to be examined, and Clinical Oncology previously published a special issue of review articles that are helpful and accessible with your RCR login http://www.clinicaloncologyonline.net/issue/S0936-6555(07)X0064-5

Books: A number of good books are available for both cell biology and radiobiology and are included in the College reading list. Weinberg is an excellent reference text but perhaps too big to rely on for last minute revision unless you have made notes. Knowles and Selby are somewhat more abridged. For radiobiology, Basic Clinical Radiobiology (Joiner and van der Kogel) is excellent and is used by most candidates.
3 Clinical Pharmacology

3.1 General Approach

Preparing for the pharmacology exam is a slightly different challenge to the other modules, mainly because there are no particularly good textbooks or resources that cover the whole syllabus without bogging you down in unnecessary detail. Therefore this "General Approach" section of our advice is longer than for the other modules.

As with all the modules, it is important to go through the FRCR Syllabus and previous Examiners' Reports to ensure you cover all the topics that are required. From the Autumn 2016 sitting, the new list of drugs being examined becomes active ("List of Anti Cancer Drugs" [https://www.rcr.ac.uk/clinical-oncology/specialty-training/clinical-oncology-curriculum]. However, this list excludes antiemetics, analgesics, steroids etc, which are on the syllabus and will be examined.

The list of drugs is long, but it is probably correct to assume that the more common drugs are likely to be examined in more detail, particularly those used in combination with radiotherapy. For example, the antimetabolites will come up - make sure to learn the enzymes involved in their activation and metabolism, as well as problems caused by abnormal enzyme activity (e.g. DPD).

Learning about the drugs in classes may be helpful, and then concentrating on important differences between the drugs within each class. This may help in revising the more difficult topics such as drug resistance and drug interactions. Digging out your old MRCP notes for the lists of CYP450 inhibitors and inducers will be useful. Also, routes of metabolism and excretion are important to learn, particularly with regards to which drugs need to have dose alterations in hepatic/renal failure.

Some clinically relevant facts are also worth picking out, since these can be easy for examiners to ask about, but impossible to answer if you haven't thought to take note of them (e.g. Cyclophosphamide given after Taxanes causes increased myelosuppression, whereas Carboplatin given after Taxanes causes reduced thrombocytopenia). Put yourself in the mind of the examiner when revising and you might spot these facts that you might otherwise miss!

There are likely to be some questions on pharmacokinetics and pharmacodynamics and it is imperative to learn the key formulae for clearance, volume of distribution etc. They can get you easy marks. Also it will be useful to learn about any drugs that have specific PK/PD characteristics (e.g. doxorubicin having a large Vd; methotrexate accumulating in third space fluids), since these also make easy pickings for examiners.

Don't forget to have a good understanding of the standard analgesics (and anti-emetics) in use, as well as which to use in renal/hepatic failure, and how to convert doses between different opiates and different steroids. Be mindful, that drugs more commonly used by haematologists (e.g. cytarabine, imatinib) are included.

Questions on biological therapies will come up, either to ask about key differences between them (e.g. which of the following agents does not act on a cell surface receptor?), or about their specific targets (e.g. wild-type or mutant proteins). Also, specific toxicities of the TKIs are useful to cover.

Finally, there is a little overlap with the Statistics Module with needing to know about the different phases of clinical trials and their design. If learnt thoroughly, this can also gain marks relatively easily. (Note: this has been formally removed from the Pharmacology Module in the revised curriculum.)

3.2 Resources

Books: Textbooks can be useful for the pharmacokinetics and pharmacodynamics, as well as for information about supportive medications, but tend not to be pitched suitably for most of the rest of the syllabus.
Websites: The British Columbia Cancer Agency Drugs Manual is an excellent resource both for the exam and afterwards:

www.bccancer.bc.ca/HPI/DrugDatabase/DrugIndexPro/default.htm

Going through the anticancer drug list one by one using this website is recommended.

4 Physics

4.1 General Approach

Those without a physics background often particularly fear the Physics exam. In fact the physics covered is essential to developing competency in both planning and managing patients receiving radiotherapy and so studying for the physics exam is useful on a day-to-day basis. There is a certain amount of “rote learning” within the physics syllabus for example dosimetry instruments but the majority requires understanding principles and applying these within the exam rather than just memorising facts. This means that the two most important things to do to prepare for the exam are to receive good teaching (either on a course and/or locally) to aid understanding and not to start so late that you don’t have time to get your head round the concepts. Although the physics can seem daunting it can be both manageable and illuminating in clinical practice.

Whilst not particularly inspiring it is important to be familiar with IRMER, IRR and the ICRU definitions — these are easy to examine and easy marks.

Do not neglect calculations, as these are potentially easy marks. Practise makes perfect and using sample questions from the RCR website is very helpful. You need to feel comfortable manipulating information and equations — calculation questions are not necessarily presented in an obvious “just plug in the numbers” fashion. In addition do not assume that when asked for figures you will always have to use one of the more complex equations — sometimes it is more straightforward, for example a calculation based on the inverse square law.

4.2 Resources

It is essential to base revision on the syllabus and look at the examiners reports for recurring themes. Sample questions on the RCR website/available on courses/in your local centre are useful to get a feeling for the type of knowledge examined and level of knowledge required.

Websites: The US have a radiotherapy physics exam called Raphex, and obtaining past papers is helpful (your colleagues are likely to have them). Some areas of the syllabus differ (ignore the diagnostic section), but the standard is similar. Be mindful of different units of measurement.

Colleagues and Courses: Although Part 1 is a theoretical examination there is a large proportion of the physics that is practical, if not clinical. Try to spend time in your physics department and on the radiotherapy machines to see the equipment you are learning about. Learning about how a wedges or a change in energy changes a dose distribution is much easier if you have seen it on planning software and had a play yourself.

Books: In terms of textbooks, Radiotherapy in Practice: Physics for Clinical Oncology is written specifically to cover the FRCR Physics module. Its chapters and subheadings cover the syllabus adequately and the practice calculations are helpful, even if some of the more difficult ones in the textbook are more complicated than those in the exam itself.

Practical Radiotherapy Planning (Dobbs and Barrett) is more clinically based but is useful back up for some specific facts/to aid understanding of particular areas of the syllabus.
5 Statistics

5.1 General Approach

Evidence-based medicine has been, and will continue to be, paramount to our practice. Understanding the design and subsequent analysis of clinical trials along with the various strengths and weaknesses associated with these trial designs is essential to a career in medicine, let alone the rapidly changing practice associated with a career in clinical oncology. Part 1 statistics will provide you with these tools. If you have done A-level statistics this will give you the vast majority of the techniques needed to pass the exam and we would recommend using these revision notes or guides.

It is also important to mention that this exam is not just about the statistical tests used in trial design but also more about trial design itself and attention to this is addressed in the recommendations below. Taking part in a Good Clinical Practice (GCP) course, which is mandatory for ST3 completion, will also help in this area.

If your department has a journal club, it will be useful to take an active role. By critically analysing the statistics used in phase III trials or meta-analysis with more senior trainees you will get a lot more confident and it will help you well beyond the exam itself. You will also start recognising patterns in regards which tests are used and in particular types of trials or studies.

5.2 Resources


Websites: The journal Critical Care published an excellent series of statistically focused articles from 2001-2005. These are all available free on-line and come with our recommendation. They are concise and pitched at the level of anaesthetic trainees undertaking the FRCA. Although the examples are usually based around intensive care, they translate well to us as clinical oncology trainees. They can be found at www.ccforum.com/series/CC_Medical. A bank of multiple-choice questions is available at www.medstatsaag.com from the publishers of Medical Statistics at a Glance.

The CONSORT Statement website is a useful resource with regards to the design of randomised controlled trials (www.consort-statement.org).