



# Review of RCOA Primary Exam 2013-2014

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## Introduction

This document will review the RCOA primary exam conducted through the year 2013-2014. It is intended that this document will be of value to examiners, Royal College departments, the GMC, trainers and trainees and the public in general.

The exam is conducted 3 times each year. In order for it to sit better within a 2 year training scheme the dates for the oral exam have been moved slightly to November & January to enable a later sitting of the MCQ whilst still allowing time for multiple attempts at the oral exam. This should allow candidates to be more experienced before their first attempt and therefore more appropriately prepared. Early evidence suggests that results in November have improved as a consequence.

Recent years have seen a significant increase in the number of candidates applying for the exam. This has put considerable strain on the examining body and on occasions has required the exam to stretch into a Saturday. Whilst recent exams have not proved so busy, they do still fill 5 days and it is anticipated that the potential to overfill the weeks will exist for some years to come. The days are long – many examiners arrive by 0730 and don't leave the college until well after 1800. Now that the exam consistently lasts 5 days or more it is important to recognise the extra strain this puts on examiners. In addition examiners are finding it increasingly difficult to obtain leave to attend for 2 full weeks every year along with extra days for working parties.

In order to deal with these issues, and to allow more of the working parties to meet during exam week we will appoint more new examiners into the probationary year. Ultimately, we intend to increase the examining body in each part of the exam by 5-10 examiners. The primary exam will therefore have to accommodate 18-20 new examiners each year for the next few years. The logistics of this are complex and will put an extra strain on the senior examiners in the Primary but it is seen as an essential move to sustain the exam for the future.

This year we recorded 5 videos for the exams website. These are aimed at candidates and their trainers and include tips on preparation, pointers as to how examiners assess candidates and a run through of the whole exam day at both MCQ & oral. This greater familiarity with the exam process should help candidates perform to their best when they attend – particularly for their first attempt.

## The Examination

The Primary exam consists of two parts:

1. A written paper
2. An oral day consisting of SOE & OSCE

The primary exam tests the knowledge and application of basic sciences to anaesthetic practice along with an introduction to the clinical aspects of the profession. The science topics covered fall into the realms of physiology, pharmacology and physics.

## 1. The Primary Written Exam:

The primary written exam consists of 2 sections:

- a. 60 MTF (multiple true/false) questions based upon physiology pharmacology and physics/clinical measurement. These are essentially a test of knowledge. Care is taken to ensure that the aggregate, historical, mean candidate score in each subject lies between 0.75-0.8 (or 0.48-0.52 for questions that ran prior to September 2009 with negative marking), and that no more than 10% of the questions have run within 2 years of the exam under construction.
- b. 30 SBA (single best answers). These are designed to examine in more detail the application of the knowledge tested in the MCQ section. In each SBA, 4 marks may be awarded for each question which reflects the ability to reject the 4 incorrect answers. Candidates have expressed concern that the SBA section may be detrimental to their chance of passing but since its inception the section pass rate in SBA has been no lower than that in the MTF section and in many cases improves their overall mark.

The MCQ Core Group convenes shortly after each written paper when each question stem is reviewed along with any candidate feedback on specific questions. The last 3 sittings have continued the historical trend of MTF questions appearing robust, performing well and/or being positive discriminators. Likewise the SBA sections consistently perform well with the best answer chosen by the majority of candidates in 27-28 of the 30 SBAs.

A maximum total score of 300 is possible for the 60 MTF questions and a further 120 marks for the 30 SBA questions. Historically, the pass marks of the MTF and SBA sections of the paper are always derived separately using the independent Angoff scores of an extended group of current and previous Core Group members. Their remit is to score the extent to which the average candidate doing the average amount of preparation will be the certain of the correct answer.

The Angoff derived mark for the MTF and SBA sections are then summated and a reduction applied to allow for one standard error of measurement (SEM). In the MCQ Exam, the applied SEM consistently reduces the pass mark in the candidates' favour by a further 9-10 marks.

The KR-20 is a measure of internal reliability and reflects the number of test items, the candidate performance on every test item and the variance thereof. The combined KR-20 of our last three papers has been between 0.87-0.92 reflecting a reassuringly high reliability of testing. (In the last three exams, the KR-20 for the MTF section was between 0.85-0.91 and the SBA section between 0.47-0.57 reflecting the lower number of questions)

### MCQ Pass rates for last 3 Years

Academic Year	2011-12			2012-13			2013-14		
Examination date	Sept 2011	Feb 2012	June 2012	Sept 2012	Feb 2013	June 2013	Sept 2013	Nov 2013	Mar 2014
Attendees	304	271	493	304	248	491	193	196	376
Pass Rate:	71.4%	55.4%	61.3%	44.6%	51.2%	59.1%	48.7%	54.6%	60.6%
MCQ Internal consistency KR-20	0.89	0.92	0.93	0.91	0.91	0.92	0.87	0.91	0.92

MCQ 2013 – 2014: Candidate Demographics

Candidates (2013-14)		n	Pass rate (%)
Gender	Male	385	58.9
	Female	380	53.1
Place of initial medical qualification:	UK	633	59.4
	Europe	9	55.5
	Rest of world	57	36.8
	Unknown	66	40.9
Current employment	Training post	659	59.1
	Non-training post	96	32.2
Ethnicity	BME	238	47.5
	Non-BME	492	60.8

## 2. Structured Oral Examination:

The SOE section of the oral examination gives the opportunity for examiners to explore a candidate's understanding as well as their knowledge of clinical and basic science concepts. To be eligible a candidate must have passed the MCQ exam.

On their first attempt candidates must take the SOE & OSCE at the same sitting. If a candidate is unsuccessful in one part they may retake this as a sole item in subsequent exams (i.e. in order to take the SOE alone they must have previously passed the OSCE & vice versa).

The oral exam is held 3 times per year and is now timed to allow candidates to enter soon after their MCQ success should they wish to do so. Recent changes to timings allow candidates more attempts before they apply for registrar jobs.

The SOE section consists of 2 parts.

SOE 1 – 2 sections testing pharmacology & physiology.

SOE 2 – 2 sections testing clinical and physics

Each section lasts 15 minutes such that a whole SOE lasts 30 minutes. In each section candidates are exposed to 3 questions of 5 minutes each.

The use of iPads for recording marks is now firmly established in the SOE process. Currently, whilst the iPad system gives an electronic record of the marks given by an examiner, the occasional technical hitch means we still have to record marks on paper as a back-up. The iPad scoring and Filemaker development continues to be refined in the anticipation that this will become purely electronic in the near future.

Each of the 4 sections of the SOE exam have their own working party that meets throughout the year. These are chaired by a senior examiner and are tasked with reviewing current questions and topics, introducing new questions and setting exams. This ensures that the SOE sections continue to evolve and remain up to date and fit for purpose. The chair of each section, or their deputy, is responsible for setting each exam and uploading questions on to the question database. Considerable effort is put into producing SOE papers that have a consistent standard to ensure that candidates receive a fair examination. In response to this each core group is provided with data on the performance of their questions (in accordance with classical test theory). These include the difficulty index ( $p$ ) [proportion of successful outcome in a question] and the discrimination index ( $D$ ) [association between candidate's success on individual questions and their success in the SOE overall. This data also provides support to section leads in focusing review efforts on questions that are performing poorly (either high or low difficulty or poor discrimination)].

This year we recorded 4 videos for the website to assist candidates preparing for the SOE exam. These highlight many of the points that examiners look for in assessing a candidate's performance and provide some tips on how they might prepare for the exam. They are available to view on the candidate resources section of the website

### Pass Rates for SOE section of Primary Exam:

Exam Year	2011 - 2012			2012 - 2013			2014 -2104		
Exam Sitting	Oct	Jan	May	Oct	Jan	May	Nov	Jan	May
Attendances	372	410	362	376	359	286	380	350	313
SOE Candidates	348	371	310	337	319	235	354	302	276
SOE Pass rate	62%	50%	57%	61%	57%	59%	67%	53%	64%

During the exam year 2013-2014 a total of 932 candidates sat the SOE of whom 61% passed. This compares favourably with previous years when 59% & 56% passed. This pass rate includes candidates that sit both SOE & OSCE as well as those that sit the SOE as a single item. Whilst the overall pass rate throughout the year for this section of the exam has not changed significantly (and may even be increasing) in recent years there is no doubt that candidates who take the SOE as a sole item have a higher pass rate at any individual sitting.

### 3. OSCE

The OSCE consists of 17 consecutive stations of 5 minutes duration each with a 1 minute break between stations. The marks from 16 of these contribute to the final mark for the candidate whilst the 17<sup>th</sup> is used as a test station for new questions.

A candidate may score up to 20 marks at each station, and the sum of their marks at every station produces their final score.

Each day the results are analysed to ensure consistency of the process. In particular candidates who score within 1 mark of the pass mark have their performance reviewed.

Currently, the exam is paper based. The long term aim is to move across to an electronic platform but the current unreliability of the Wi-Fi connection precludes this. It is essential with such a large number of marks and quick candidate turn over that we do not encounter dropouts or disconnection from the network. Either this needs to improve or we develop a way of communicating with the base stations via an Ethernet cable. This will continue to be reviewed by the exam board.

#### OSCE Developments in 2014:

a. Communication/history/interaction stations: the current assessment system allows some candidates to exhibit random 'scattergun' answers and still gain good marks for a station. Ideally, these stations should reward those candidates who give a structured and organised response. To achieve this, the OSCE review group have developed a new assessment system which allocates half the marks on each station to the quality of the communication, organisation and structure of the answers. This will better recognise the stronger, more organised responses and consequently reward those who perform to a high standard. This has been evaluated throughout 2014 and will be introduced in the near future.

b. Computer interactive stations: these new stations remove the requirement for the presence of a dedicated examiner in the booth by designing a standalone kiosk capable of presenting a repeating 5-minute computer-based OSCE question to an entire round of candidates. In addition they improve question reliability by accommodating 'best of 5' responses rather than existing paper-based 'T/F' responses (reducing chance element from 50% to 20%) and removal of ability of candidates to go back and to amend previous responses. Current questions in the database have been rewritten to accommodate this new format and have been evaluated throughout the year.

### *Pass Rates for OSCE section of Primary Exam:*

Exam Year	2011 - 2012			2012 - 2013			2014 -2104		
Exam Sitting	Oct	Jan	May	Oct	Jan	May	Nov	Jan	May
Attendances	372	410	362	376	359	286	380	350	313
OSCE Candidates	331	351	294	337	297	248	339	281	255
OSCE Pass rate	67%	53%	56%	68%	53%	69%	73%	59%	56%

A total of 875 candidates undertook the OSCE in 2013 with a pass rate of 63%. Again this includes those that take both parts of the exam at the same sitting as well as a sole item. This overall pass rate compares favourably with previous years of 63% & 59%. As we have found with the SOE it is clear that those candidates who attend for a single part have a considerably higher pass rate.

### **Quality Assurance:**

It is vital to ensure the exam process is of high quality and remains fit for purpose. We are keen to ensure that the principal variable affecting the outcome for a candidate is their performance alone rather than inconsistency in the impact of the examiner, process or environment on the result. We have therefore developed the exam to ensure consistency in these three areas.

#### *a. Examiners:*

New Examiners:

The primary exam is unique in that it receives new examiners and is responsible for their induction and training. Whilst this is now an established and well developed process, the increasing numbers of appointments puts considerable strain on the probationary year.

New examiners fill in a standard application form detailing their teaching, training, examination and admin experience. These are scored blindly by members of the exams committee and the top cohort of applicants duly appointed to the exam board.

All new examiners must attend a training day prior to commencing their first exam. In addition they are invited to attend for the May exam immediately following their appointment and prior to commencing their term. These are designed to ensure new examiners are well prepared for their first year of examining.

During their probationary year, new examiners are paired with senior examiners to ensure they are familiar with the process. One of these examiners contacts them in the week prior to commencing to help address any last minute issues they may have.

During their first year, videos are taken during both examining weeks and senior examiners audit their performance. This data, along with the videos, is discussed at an appraisal at the end of their first year to give them an opportunity to reflect on their progress, formally discuss any issues they may have and discuss future contribution to the exam.

In 2014, 8 third year examiners moved up to final. This left 3 examiners in the primary to enter year 4. Whilst this can be accommodated in the short term there is the potential to be short of senior examiners in the longer term and the primary examiner body need to ensure that they can keep enough examiners each year to allow appropriate succession planning for senior roles in the future. The alternative would be for examiners in their senior years to flex more between the final and primary exams.

#### Senior Examiners:

Senior examiners contribute to the running of the exam during the week, chairing exam working parties and helping the training and assessment of new examiners. Currently, there is no further assessment, appraisal or review of senior examiner performance after their first year appraisal. In 2014 -2015 we are therefore introducing an audit and appraisal system for senior examiners. Initially this will concentrate on year 5 examiners. At this stage examiners are firmly embedded in the primary structure and are looking to increase their contribution to the exam in senior roles. This is an appropriate time for them to review their performance and discuss these future contributions. Once this process for appraisal has been developed for them we plan to extend it to other senior exam years.

#### *b. Exam process:*

In order to ensure the exam process is consistent, fair and up to date we conduct regular working party meetings where groups of examiners in the MCQ, OSCE and SOE review and update their question banks. A senior examiner chairs these working parties.

Visitors to the exam are welcome. This gives an opportunity for Consultants from around the country to familiarise themselves with the current exam process and standards expected of trainees. This will help them to align practice sessions in their trust to the structure and standard expected in the exam. In addition, we ask them to rate the overall standard of the exam to that expected of trainees at 12-18 months experience. They also have the opportunity to feedback ideas for improvements, which are then considered by the exam body. This is a valuable source of external QA and has provided us with some valuable new initiatives.

We have regular visits from the Patient Liaison Group. Whilst being interested in the overall exam process they have been particularly valuable in the development of the communication stations and associated new assessment process

At the end of each exam day the body of examiners meets at callover to discuss the exam for that day. We recently dispensed with the reading of all candidate results at callover as it appeared to add little to the work done by the college staff. This has been evaluated over the year and has been well received by the examiner body as a whole. However, callover remains a vital part of the exam process. Cumulative results for the week are discussed, exam process issues are presented and discussed and problem candidates and poor performance shared. Borderline marks are

reviewed in both OSCE & SOE before publication. All '36' marks in the SOE are checked for accuracy and comments are logged.

Incident forms are filled in by floor supervisors and presented at callover to allow all examiners to learn and reflect on the process. Over the year we have introduced a candidate feedback form to enable candidates to feedback to the exam about their experience and suggest developments to make the experience more bearable.

A review group of senior examiners meets at the end of each exam week to discuss the exam process, prize winner, new developments and problems arising during the week. This is a vital part of the process to ensure that problems, improvements and developments are appropriately discussed and approved by the senior exam body.

*c. Environment:*

Comments made by visitors and feedback from trainees have helped us to make changes to the exam environment to reduce the impact that this might have on a candidate performance. This has included clearing the central OSCE area, sound proofing the walls with sound reducing paint, improving the locker and changing facilities and the welcoming of candidates.

*Overall Pass Rates for Primary Exam:*

Academic Year	2011-12			2012-13			2013-14		
	Oct	Jan	May	Oct	Jan	May	Nov	Jan	May
Exam sitting									
Attendees	372	410	362	376	360	286	380	350	313
Pass Rate:	54 %	42%	51%	55%	46%	56%	59%	48%	51%

*Demographics for Primary Exam 2013 - 2014*

Candidates (2013-14)		n	Pass rate (%)
Gender	Male	570	53.2
	Female	473	52.9
Place of initial medical qualification:	UK	883	56.0
	Europe	13	30.8
	Rest of world	93	37.6
	Unknown	54	37.0
Current employment	Training post	874	56.0
	Non-training post	146	37.0
Ethnicity	BME	354	42.9
	Non-BME	677	58.6

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