



Review of RCOA Primary Exam 2014-2015

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Chairman Primary Exam



Introduction

This document will review the RCOA primary exam conducted through the year 2014-2015. 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. Overall the results over the year maintain consistency with previous years with the recent trend of greater pass rates in November continuing.

The recent increase in numbers attending for the exam has continued throughout the year. This puts considerable strain on the examining body but the recent strategy to increase the number of new examiners has eased the situation each week. This does enable us to run core group sessions during the week thereby reducing the need for extra days between exams to attend the College. However, this leaves us relatively short of senior examiners to run the week and supervise the newer cohorts of examiners. It will be some years until the strategy reaches the more senior levels of the exam.

The days are long – many examiners arrive by 0730 and don't leave the college until well after 1800. Recent changes to callover have enabled us to finish the day earlier whilst still maintaining its purpose to quality assure each day, discuss problems and prepare for the next day.

Mike Wilkinson, Chairman of the Primary exam from 2012 – 2015 steps down after 3 years in post. Dr Andy McIndoe has been elected as his successor and takes up post in September. Mark Blunt continues as Deputy Chair and Tina Mcleod has been appointed as the second Deputy Chair to replace Andy.

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 of the sixty questions 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 the application of the knowledge tested in the MCQ section. In each SBA, 4 marks may be awarded for each question. This 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 the last two years has been significantly higher, improving the overall pass rate.

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 set.

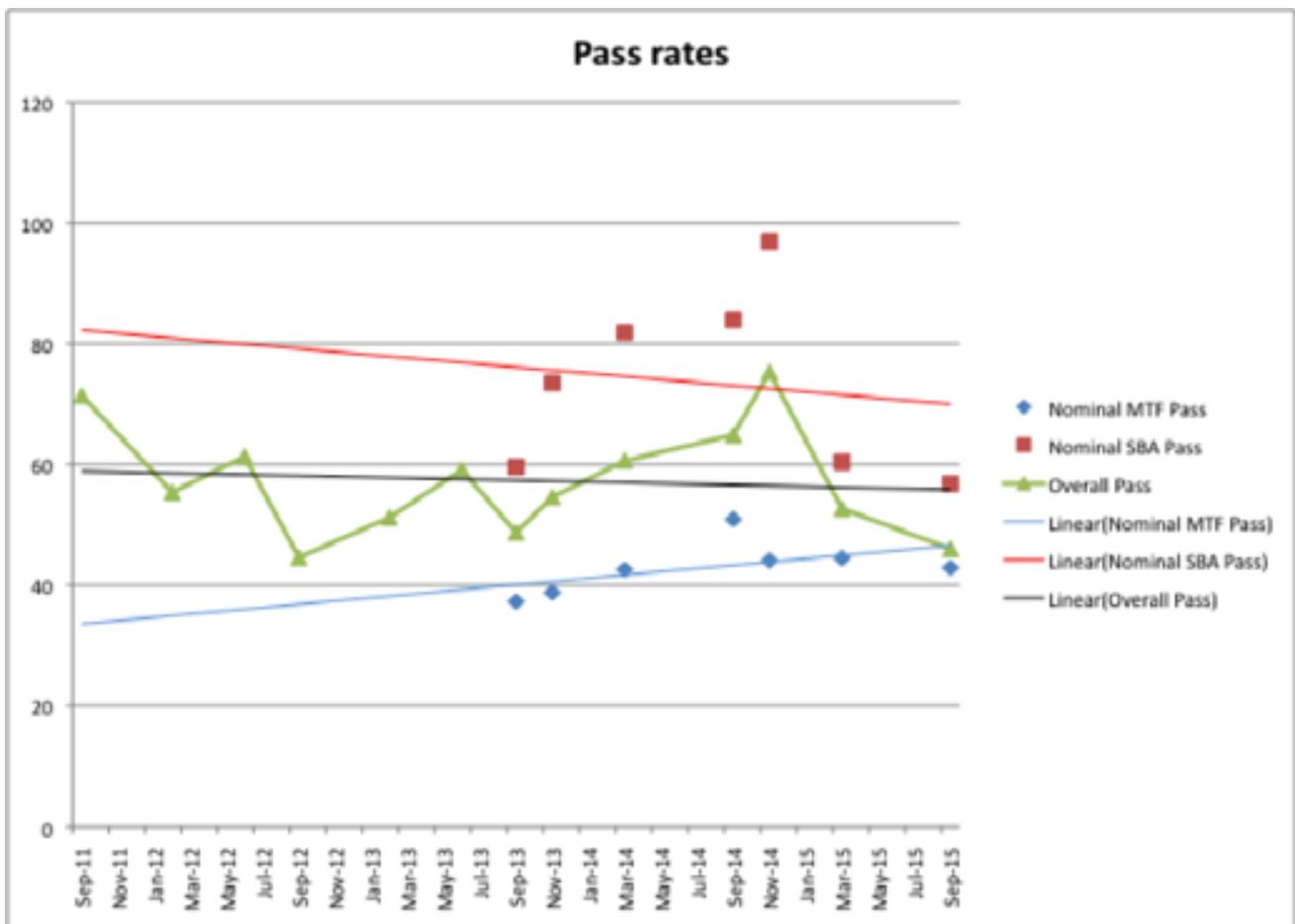
A maximum total score of 300 is possible for the 60 MTF questions and a further 120 marks for the 30 SBA questions. Historically, the pass marks of the MTF and SBA sections of the paper are always derived separately using the independent Angoff scores of an extended group of current and previous Core 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. It is noteworthy that the averaged Angoff scores used within the MCQ Examination have remained remarkably consistent over the years.

The Angoff derived mark for the MTF and SBA sections are 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. Furthermore, where statistical analysis derives marks that are not whole numbers, these are rounded down to again favour the Candidates.

The KR-20 is derived as a measure of internal reliability of the Examination and reflects the number of test items, the candidate performance on every test item and the variance thereof. The combined KR-20 of the last three papers has been between 0.9-0.92 reflecting a reassuringly high reliability of testing. (In the last three exams, the KR-20 for the MTF section was between 0.89-0.91 and the SBA section between 0.54-0.65 reflecting the lower number of questions). The KR-20 of the SBA section has been steadily increasing in recent years. The Primary MCQ Examination continues to perform well. The pass rates in the three 2014-15 examinations (64.9%,75.3% and 52.7%) are in line with those seen in previous years. Attendee numbers were back up to historical levels (941 sittings) after an apparent fall in numbers in the previous examination year (765 sittings)

Table Primary MCQ Performance in the last 4 years						
Examination Year	Attendees	Overall	MTF Nominal	SBA Nominal	Angoff Mean	Exam KR-20
Sitting	Per Exam	Pass Rate	Pass Rate	Pass Rate	score/420	Reliability
2011-2012						
Sep-11	308	71.4%	N/A	N/A	310	0.89
Feb-12	271	55.4%	N/A	N/A	309	0.92
Jun-12	493	61.3%	N/A	N/A	306	0.93
2012-2013						
Sep-12	304	44.6%	N/A	N/A	312	0.91
Feb-13	248	51.2%	N/A	N/A	297	0.91
Jun-13	491	59.1%	N/A	N/A	307	0.92
2013-2014						
Sep-13	193	48.7%	37.3%	59.6%	301	0.87
Nov-13	196	54.6%	38.8%	73.5%	309	0.91
Mar-14	376	60.6%	42.6%	81.9%	304	0.92
2014-2015						
Sep-14	350	64.9%	50.9%	84.0%	297	0.91
Nov-14	263	75.3%	44.1%	97.0%	309	0.9
Mar-15	328	52.7%	44.5%	60.4%	313	0.92

The November 2014 Examination saw the planned rerun an entire past paper (from February 2012). It was demonstrated that rerunning an entire examination resulted in a significantly increased pass rate (75.3% cf 55.4% in February 2012). However, it was performance in the SBA questions that was mainly improved (97 % vs 84% in February 2012). The performance in the MTF section was similar to that of the 2012 cohort (nominal pass rate of 44% vs 50.9% in February 2012). It was thought that there were several potential reasons for this improvement. Firstly, some previously run SBA questions are now available within various RCoA examination resources. Secondly, it is known that candidates do memorise questions to take back to the organisers of various Primary FRCA preparation courses where there is specific interest and focus on the SBA format. Finally, candidates may now be getting more used to the concept of SBAs and becoming better prepared to answer them. These conclusions will need to be considered in the construction and standard setting of future papers.



P.Hodgson Nov 2015

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 processes involved in the SOE section are now well established. One of the potential criticisms of this type of exam is the influence of bias and variability on a candidate's performance. Mark Blunt, Deputy Chair of the exam, undertook a Rasch modelling exercise to look at 106,004 scores over the last 15 sittings of the exam. This establishes the probability of a score based upon the ability of the candidate, the stringency of the examiner and the difficulty of the question. Reassuringly the results confirmed that the Primary SOE achieved a high level of reliability in the Utility Index expected for a high stakes examination.

Each of the 4 sections of the SOE exam have their own working party. These are chaired by a senior examiner and are tasked with reviewing current questions and topics, introducing new questions and setting exams. Given the recent increase in the number of examiners we are now able to hold these during exam week. As examiners are finding it increasingly difficult to get time away from their trust, this is providing a more consistent attendance at meetings. In order to maintain the standard of question papers, we continue to use 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).

In addition to the 4 videos on the website specifically looking at the SOE questioning, we have added one on the daytime process of the exam. This is designed to assist those new to the college to familiarise themselves with order of the day and the facilities in an attempt to reduce the stress associated with attending for the oral day.

Results 2014-15:

		Nov 2014	Jan 2015	May 2015
Sitting All Parts	No Attending	291	276	230
	Pass No.	199	167	140
	Pass %	68%	61%	61%
Sitting SOE Alone	No Attending	35	57	51
	Pass No.	17	44	36
	Pass %	49%	77%	71%
All Candidates	No Attending	326	333	281
	Pass No.	216	211	176
	Pass %	66%	63%	63%

Recent pass rates for SOE section of Primary Exam:

Exam Year	2012 - 2013			2013 -2014			2014 -2015		
	Oct	Jan	May	Nov	Jan	May	Nov	Jan	May
Exam Sitting									
Attendances	376	359	286	380	350	313	375	380	341
SOE Candidates	337	319	235	354	302	276	326	333	281
SOE Pass rate	61%	57%	59%	67%	53%	64%	66%	63%	63%

During the exam year 2014-2015 a total of 940 candidates sat the SOE of whom 64% passed. This compares favourably with previous years when 61% & 59% 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.

Of note is the continued higher pass rate of these candidates who take the oral exam in November. These 3 years of increased pass rate follow on from changes in date of the exam which more closely link the MCQ & oral exams in September/November.

3. OSCE

The OSCE consists of 17 or 18 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 additional stations are used to test 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.

The passmark for each individual station question set is derived by modified Angoff technique. The overall passmark for each OSCE round is an aggregate of these scores and approximates to around 220 marks (out of a possible 320). 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 2015:

a. Communication/history/interaction stations: a new assessment system has now been introduced into the history and communication stations. This better rewards those candidates who approach the question in an organised and professional manner rather than exhibiting a random scattergun approach. This approach to assessment has strong support of our Lay committee members.

b. Computer interactive stations: these 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. Following a year of evaluation we have now introduced these questions into the formal exam process. Despite the technical challenges encountered this has been a successful introduction and the working party are now tasked with expanding the question bank to incorporate more booths.

The ultimate aim for e-marking is to incorporate into every station. However, the lack of reliability of the technology currently precludes this. Given the vast number of responses and the consequences of losing the electronic record the continued use of paper marking is unavoidable.

Results 2014-15:

		Nov 2014	Jan 2015	May 2015
Sitting All Parts	No Attending	291	276	230
	Pass No.	207	159	128
	Pass %	71%	58%	56%
Sitting OSCE Alone	No Attending	49	47	60
	Pass No.	40	32	51
	Pass %	82%	68%	85%
All Candidates	No Attending	340	323	290
	Pass No.	247	191	179
	Pass %	73%	59%	62%

Recent pass rates for OSCE section of Primary Exam:

Exam Year	2012 - 2013			2013 - 2014			2014 - 2015		
Exam Sitting	Oct	Jan	May	Nov	Jan	May	Nov	Jan	May
Attendances	376	359	286	380	350	313	375	380	341
OSCE Candidates	337	297	248	339	281	255	340	323	290
OSCE Pass rate	68%	53%	69%	73%	59%	56%	73%	59%	62%

A total of 953 candidates undertook the OSCE in 2014/15 with a pass rate of 65%. 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% & 63%. 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.

Consistent with the SOE the November exam pass rate continues to exceed that of other sittings. These results are higher than previous years before the exam dates changed and as we collect more evidence it looks increasingly likely that the date changes have considerably helped those candidate who link the 2 parts in September/November.

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 continued our standard assurance processes around new examiner monitoring, continual assessment of examiners, auditing of examiners, candidate feedback, visitor opinion and the maintenance of callover as a daily assurance of the process from the whole examining body.

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 measures 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 2015, 8 third year examiners moved up to final. Of more importance is that despite this we were able to keep 8 examiners in Primary. As years go by this will swell the number of senior examiners considerably and greatly ease the shortage of senior examiners to run the exam each week.

Senior Examiners:

During the year we have introduced the video assessment and audit of more senior examiners. This commenced with 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.

Tina Mcleod was appointed as our appraisal lead charged with developing a continuous process of assessment and feedback throughout the senior years as an examiner. To that end we anticipate a more robust process developing during the coming 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. Given the expansion in numbers we can now accommodate these during exam weeks which greatly reduces the extra commitment from examiners throughout the year.

We continue to welcome and value the contribution of visitors. Whilst providing them with an insight into the exam process it will also help them to align practice sessions in their trust to the structure and standard expected in the exam. In addition, they are a valuable source of feedback on the standard of the exam as they are closely involved with trainees at this level and the standards expected of them. Reassuringly they generally assess the standard as appropriate and the quality of examiners as fair and consistent.

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. Whilst not now reading the exam results each evening, 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.

Overall Pass Rates for Primary Exam 2014/15:

Academic Year	2012-13			2013-14			2014 - 15		
	Oct	Jan	May	Nov	Jan	May	Nov	Jan	May
Exam sitting									
Attendees	376	360	286	380	350	313	375	380	341
Pass Rate:	55%	46%	56%	59%	48%	51%	60%	52%	55%

Dr Mike Wilkinson
Chairman, RCOA Primary Exam,
November 2015