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Review of RCOA Final Exam 2013-2014

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Final Fellowship of the Royal College of Anaesthetists (FRCA)
Examination Chairman's Report

Academic year (Sept 2013 – July 2014)

Outline:

The aim of this document is to provide a summary of the Final Fellowship of the Royal College of Anaesthetists examinations undertaken during the Academic year September 2013 –July 2014. It is hoped to be relevant to the General public, Examinations and other Departments within the College, The General Medical Council (as our Regulator), Examiners and candidates. Different parts of this report may be relevant to different parties but a single report may provide a balanced overview rather than multiple separate reports.
A single report is provided for the academic year to avoid repetition of common themes.

The Final examination is in two parts:

1. a written examination
2. a structured oral examination.

Each will be considered separately as they represent stand alone examinations.

Three areas will be described for each examination type:

1. Outcome statistics for each examination
2. An assessment of utility of the examination
3. A brief overview of areas of poor candidate performance to drive learning.

The Final examination is a national test of knowledge as laid out in the Intermediate Curriculum agreed with the General Medical Council. The examination is embedded within the Curriculum and anaesthetists in training may not progress to Specialist Training Year 5 without possession of this qualification (or equivalent).

1. The Final written examination.

The Final written examination consists of two parts:

a) 90 question multiple choice paper (MCQ) consisting of 60 five part True / False questions and 30 Single Best Answer Questions)
b) Short Answer Question Paper (SAQ) consisting of 12 individual questions, all of which must be attempted.

It was held twice in the 2013-14 academic year (September 2013 and March 2014) in a number of venues across Great Britain and Northern Ireland. Both elements of the examination are essentially tests of knowledge (knows – under Miller's Pyramid of competence).
The format of the examination has not changed significantly in the last five years. The composition of the SAQ paper has been mapped against the Curriculum since 2012 to ensure that the full range of the Curriculum is sampled in a question paper.

The examination is passed or failed as a whole entity with marks attained from both parts of the examination being added together.

a) Outcome Statistics:

Academic Year	2011-12		2012-13		**2013-14**	
Examination date	Sept 2011	March 2012	Sept 2012	March 2013	**Sept 2013**	**March 2014**
Number applicants	378	439	360	492	**348**	**461**
Withdrawals / non attendees	13	21	17	11	**13**	**20**
Attendees	365	418	343	481	**335**	**441**
Pass Rate: Number (%)	249 (68%)	273 (65%)	177 (52%)	285 (59%)	**227 (68%)**	**305 (69%)**
MCQ Internal consistency KR-20	0.80	0.72	0.72	0.79	**0.80**	**0.82**
SAQ Internal consistency Chronbachs alpha	0.81	0.76	0.75	0.74	**0.68**	**0.74**

The pass rate for both sittings during this Academic year is higher than the previous year but similar to the academic year 2011-12. A number of factors are associated with examination success, and are considered further under examination utility.

b) Examination Utility:
The utility of any formal assessment (examination) may be regarded as a compilation of the reliability, validity, cost, acceptability and education impact.

Reliability:
The Final Written Examination is a high stakes examination requiring good reliability and validity.
The MCQ is a long examination (3 hours) with a large number of separate questions. The use of a long examination time with multiple different questions aims to provide good examination reliability. The pass mark for this part of the examination is criterion referenced. Two years ago, a small subgroup was established (Angoff Group) who define the pass mark.
In addition, attempts are made to establish aspects of the Reliability of the MCQ paper. The Kuder Richardson Formula (KR-20) is calculated for each set of MCQ paper results. This is a measure of internal consistency (an aspect of reliability) for dichotomous data. KR-20 results in this academic year for the MCQ papers were 0.80 (September 2013 MCQ) and 0.82 (March 2014). These values represent the highest levels in reliability since this calculation was commenced

and reflect the increasing expertise of the MCQ group as a whole and Angoff specialist sub-group.

Each question in the SAQ paper is marked out of a total of 20 marks by a single examiner against a model answer. An individual examiner marks two of the twelve questions with a single candidate having 6 examiners in total assessing separate parts of their response. In order to provide a standardized approach all examiner marking a single pair of questions meet together to agree a model answer well in advance of the planned paper, and then mark together four specimen answer papers to ensure a standardized interpretation of the model answer. The SAQ paper is also a pure assessment of knowledge but in a different format from the MCQ. The pass mark for each individual question is set by the core group but then refined but each marking group. The test of Internal consistency used of this paper is the Chronbachs alpha calculation (as the data is continuous not dichotomous). Results in the most recent examinations are shown in the table above. The value of Chronbachs alpha in December 2013 was disappointing and was considered at length. The improvement in March 2014 to historical levels is noted.
The pass rates of the written examination are repeatedly analysed each year by gender, ethnicity, present anaesthetic post, country of initial medical qualification and qualification allowing sitting for the Final FRCA examination. Data on candidate sexual orientation is not collected. Data for the Academic year are shown in Table 1.

Table 1: Outcomes by category for the Written Final Examination:

Candidates (2013-14)		n	Pass rate (%)
Gender	Male	430	66.5
	Female	346	71.1
Place of initial medical qualification:	UK	605	75.7
	Europe	22	59.1
	Rest of world	113	40.7
	Unknown	36	41.7
Current employment	Training post	650	74.5
	Non-training post	126	38.1
Place of Primary FRCA (or equivalent)	UK	649	75
	Ireland	102	37
	Other	30	23
Ethnicity:			
Black and Minority Ethnic group (BME)		284	49
Non BME		482	80

In the academic year 2013 -2014, candidates were more likely to pass if they were female, their Initial Medical Qualification was from the United Kingdom, were in a training post, had the UK Primary as their qualification allowing entry

to the Final examination, and were not from a Black or Ethnic Minority (BME) background. This is unchanged from previous years
Understanding the meaning of this data is fundamental to the reliability, validity and overall utility of the Final FRCA written examination. It is important to recognize that the MCQ paper is marked by a computer and SAQ paper marked by examiners blinded to all the factors listed above. Examiner bias either conscious or sub conscious cannot therefore explain these results. Many of these factors are not independent of each other and this makes their interpretation difficult. A substantial piece of work is at present taking place to try and understand these results and will be published once available.

Cost, accessibility, feasibility and educational impact:
The cost of the Final written examination was £455 in the academic year 2013-4. This represents an increase of 2.3% over the previous year. It is extremely important to ensure this examination is accessible to all. Anaesthesia is the largest hospital specialty with many candidates needing to take this examination each year for career progression. Capacity is in place and has allowed all eligible candidates applying to take the written examination in 2013-14 to do so. In addition the multiple examination halls hired (including across all four Health jurisdictions) supports access to the examination. The fees levied to take the examination are a reflection of the costs incurred and do not provide a significant source of income over expenditure to the College. The numbers siting the examination have varied from 350 to 500 per year over the last decade with relatively static numbers over the last few years.

c) Areas of poor candidate performance.
To date the results of the MCQ examination with multiple discrete assessments have not been analysed to identify areas of candidate weakness. This will occur in the next academic year when the structure of the MCQ examination is changed to be formally mapped against the Intermediate Level Training Curriculum. The change will allow this advice to be offered in the future.
The Lead of the SAQ group produces a detailed report, freely available on the College Web site, describing performance at each SAQ paper sitting. Details of the pass rate for each individual question are included and considerable detail on answers required. In the last academic year the following important areas were identified where candidates knowledge was concerning:

1. Knowledge of anatomy
2. Understanding of target controlled infusions of propofol
3. Human factors associated with drug errors.

The lack of even basic knowledge of anatomy has been identified over a number of years, reflecting the fall in teaching of basic sciences at undergraduate level. The need to learn and test anatomy remains of fundamental importance particularly with the resurgence of Regional Anaesthesia in UK in the last decade. Anaesthetists are commonly placing needles in a range of sites for local anaesthetic blocks and must understand key structures the needles may approach / hit.
The poor knowledge of the science behind Target Control Infusions of Propofol is also concerning. This is a common technique in regular use in almost every anaesthetic department in the UK. A lack of understanding of the applied

pharmacology (pharmacokinetics) underlying this technique represents significant safety concerns.
This will be fed back via the College tutor network to drive learning.

2. The Structured Oral examination.

Candidates may only take the Final Structured Oral Examination (SOE) once they have been successful at the Final written examination. The oral examination consists of two parts:

a) Structured Oral Examination 1 (Clinical) consisting of a 40 minutes review of one long clinical case and three short clinical cases.
b) Structured Oral Examination 2 (Applied Science) consisting of a 30 minute review including sciences applied to patient care (anatomy, physiology, pharmacology, physics and clinical measurement).

Although all questions are structured the face to face nature of the examination allows exploration not only of knowledge but the understanding (application) of that knowledge. This represents "knows how" in Miller's pyramid.
The examination is held twice per year approximately 2 months after the written examination to allow smooth progression through both parts of the Final examination.

a) Outcome Statistics:

Academic Year	2011-12		2012-13		**2013-14**	
Examination Date	Dec 2011	June 2012	Dec 2012	June 2013	**Dec 2013**	**June 2014**
Candidates attending	373	363	297	360	**351**	**384**
Pass rate Number (%)	254 (68%)	237 (68%)	187 (63%)	234 (65%)	**235 (67%)**	**261 (68%)**

A total of 735 candidates sat the Final Structured Oral Examination in the Academic year 2013-2014, of which 67.62% were successful. This pass rate is similar to previous years with pass rates of between 60 and 70% for almost all sittings of the examination in the last 5 years.

b) Examination Utility:
It is important to ensure that the SOEs are a reliable and valid test of knowledge and understanding of the Intermediate Curriculum. As a test of clinical knowledge this remains a professional judgment. During the academic year more than 70 individuals observed the SOEs, the majority being Consultants in active clinical practice from across the United Kingdom. All were asked to provide written feedback on the content and conduct of the examinations they had observed. During this year there was a uniformity of view that the clinical cases used were highly reflective of UK practice and were pitched at an appropriate level to effectively assess anaesthetists at the appropriate level of training. All questions are held in a computerized bank. Most have been used on a number of

occasions with any individual candidate being exposed to at most one new question without statistics The examinations are therefore put together to provide a paper of approximately equal difficulty on each of the examination days. No substantial swings in pass rate were seen across the different days. Both examiners and visitors have increasingly commented on the clinical inexperience of candidates taking the Final FRCA examination. Many of the questions which form core elements of the Intermediate Level Training Curriculum are met by answers showing theoretical (book) knowledge but no practical knowledge of having seen the clinical situations in either a supervised or unsupervised capacity. This is clearly unsatisfactory. Overall independent observers regard the assessment as being valid and relevant.

The last year has seen a strengthening of the Quality Assurance Group. This is a small sub group of examinations with the specific task of auditing the quality of individual examiner practice and providing feedback on aspects of good and less good practice to support examiner development. As part of the Revalidation process, each examiner in their first year as a Final examiner and in Year 7 overall as an examiner received a formal Appraisal of their effectiveness as an Examiner to form part of their whole practice Annual Appraisal. Each examiner will therefore receive a written summary of performance at least once in a five year Revalidation Cycle. In addition, each examiner received this year a summary of the marks they gave to all candidates examined compared to their colleagues. The Final FRCA examination is unusual in having a small number of examiners (60 individuals) who commit to examining for the full 10 days or Oral Examinations per year. They high highly trained, performance is frequently assessed, and the multiplicity of recorded candidate examiner interactions means that we have high quality data on individual examiner performance. This allows any slight difference in examiner scoring from the norm to be rapidly identified and addressed.
8 new examiners joined the Board of Final examiners at the start of the Academic year replacing a number of colleagues relinquishing their examining role at the end of their term of office. The pairing of new examiners with experienced colleagues in their first Final year allows rapid assimilation to the professional standard expected.
There were no episodes of concern of Examiner Performance identified within the Academic Year 2013-14. It is my view that we therefore have some evidence to suggest examiners function appropriately in their role.

Analysis of pass rates in the Final SOE examinations in the Academic Year 2013-4 by a range of characteristics are shown in Table 2 (overleaf).

Table 2: Outcomes in the SOE for the Academic year 2013 -4:

Candidates (2013-14)		n	Pass rate (%)
Gender	Male	405	65.7
	Female	330	70.0
Place of initial medical qualification:	UK	579	73.7
	Europe	24	54.2
	Rest of world	114	39.5
	Unknown	18	66.7
Current employment	Training post	674	69.9
	Non-training post	61	42.6
Ethnicity	BME	243	53
	Non BME	484	75
Exempting Qualification			
UK Primary FRCA		572	74
All other exempting qualifications		163	46

This shows the same trends as the written Examination with higher pass rates for Females, UK medical graduates, those employed in training posts, Primary FRCA holders and non BME candidates. Again the characteristics are not independent and further analysis will be published in the near future.
Whatever the outcome of the review it is important to ensure that disadvantaged groups are appropriately supported and advised. The College may wish to put on specific courses to help these groups once the figures are fully understood.

Cost, accessibility and educational impact:
The cost of the Final SOE in this academic year was £540, an increase of 1.9% on the previous year. Again the administration of the Final SOE Examination does not represent a source of income generation for the College. All candidates wishing to take this examination were accommodated during the two examination weeks. The number of candidates applying to take the examination has fluctuated between 300 and 400 applicants over the last 7 years, which can be managed efficiently within the present examination structure. An increase in numbers beyond 400 would be in excess of present trained examiners able to undertake examining and the present examination halls.
In addition to the books produced by the College, and Revision Course run, the College produced in 3013-14 a series of Films of staged Structured Oral Examinations showing examples of successful and unsuccessful mock candidates. They are present on the College website. We hope they will help candidates in their examination preparation. In addition, in this academic year, an on line system of application process to apply to sit the examination has also been introduced.

Summary:
In summary the Academic year 2013-14 saw a substantial number of candidates sit and pass the Final FRCA examinations. The vast majority of candidates are in UK training posts within the NHS, following the 2010 Anaesthetic Curriculum approved by the GMC, and looking to complete training within the UK. The examination is a UK examination designed to meet the training need of doctors aiming to serve the UK population. The Academic year was one of consolidation of changes in the Written Parts of the Examination, and refinement. It has allowed a period of reflection to consider how the examination may best evolve to meet the needs of the General Public, and effectively and reliably assessing anaesthetists in training.

Michael Tremlett
November 2014.