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FROM THE EXAMINATIONS DEPARTMENT

Final Report May 2013 Part 1 FRCOphth Examination

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Summary

The twenty-first Part 1 FRCOphth examination took place on 13 May 2013. 102 candidates sat the examination, of whom 54 (53%) fulfilled the criteria required to pass the examination overall.

The assessment of the basic sciences that form the foundation of clinical ophthalmology remains a significant challenge to candidates but the pass rate now meets the minimum considered to be credible by the examiners (see appendix 2).

The examination is highly reliable, with both parts meeting GMC standards.

The pass rate for the examination appears to have stabilised at just over 50%.

The correlation between the two papers is acceptable at 0.72.

There was no significant difference in the performance of candidates based upon gender, OST, country of qualification or ethnicity. Candidates whose first language was English performed better.

MCQ examination

Content (Table 1)

Topic	Jan 2011	May 2011	Oct 2011	Jan 2012	May 2012	Oct 2012	Jan 2013	May 2013
Anatomy/embryology	23	25	23	25	23	24	25	24
Optics	24	25	25	25	24	24	25	24
Pathology	24	26	23	25	23	23	24	23
Pharmacology & genetics	18	15	18	17	18	18	20	18
Physiology	21	22	24	20	23	23	20	23
Miscellaneous & investigations	7	7	7	8	8	8	5	8
Total	116	120	120	120	119	117	119	120

MCQ paper statistics

Mean score:	69 (57.5%)
Median score:	68.5 (57%)
Standard deviation:	14.3 (11.9%)
Candidates:	102
KR20: (measurement of reliability)	0.9
Standard error of measurement (SEM):	5 (4%)
Range of marks:	27-105 (23%-88%)
Pass mark derived from Standard Setting:	69 (58%)
Pass mark – 1 SEM	64 (53%)
Pass rate:	51/102 (50%)

Distribution of scores (Table 2)

Range of scores	Distribution	Number
1-30	/	1
31-40	//	2
41-50	//// ////	10
51-60	//// ////	10
61-70	//// //// //// //// //// //// //	33
71-80	//// //// //// //// //// //	27
81-90	//// //// ///	14
91-100	///	3
101-120	//	2
Total		102

Standard setting

The pass mark for the paper was agreed using the Ebel method.

(Table 3)

	Difficult	Moderate	Easy	Total
Essential	1	25	30	56
Important	2	31	19	52
Supplementary	1	7	4	12
Total	4	63	53	120

The Part 1 FRCOphth Sub-Committee considered the success of a minimally competent candidate in each category as below:

(Table 4)

	Difficult	Moderate	Easy	
Essential	0.55	0.65	0.75	
Important	0.45	0.5	0.55	
Supplementary	0.25	0.25	0.25	

(Table 5)

	Difficult	Moderate	Easy	Total
Essential	0.55	16.25	22.5	39.3
Important	0.9	15.5	10.45	26.85
Supplementary	0.25	1.75	1	3
TOTAL	1.7	33.5	33.95	69.15

The MCQ pass mark = 69/120 (58%)

Comparison of pass marks and rates for last 7 MCQ papers (Table 6)

	May 11	Oct 11	Jan 12	May 12	Oct 12	Jan 13	May 13
Candidates	95	122	66	104	150	91	102
Mean score	64	67	64	66	70	67	69
Reliability (KR 20)	0.9	0.9	0.9	0.9	0.9	0.9	0.9
SEM	5	5	5	5	5	5	5
Standard setting	Ebel	Ebel	Ebel	Ebel	Ebel	Ebel	Ebel
Pass mark	65 (54%)	67 (56%)	66 (57%)	67 (56%)	66 (56%)	67 (56%)	69 (58%)
33% discrimination							
Negative	9	10	6	5	2	7	5
Poor (0-0.249)	56	44	56	54	51	47	48
Good (>0.250)	52	66	54	60	64	65	67
Facility							
Difficult (<25%)	10	7	5	10	2	8	5
Moderate	92	91	98	85	92	87	85
Easy (>75%)	18	22	13	4	23	24	30
Questions	120	120	116	119	117	119	120
Pass number (rate)	47 (51%)	67 (55%)	22 (42%)	51 (49%)	95 (63%)	46 (51%)	51 (50%)

The CRQ paper

(Table 7)

Question	Subject	Topic	Sub-sections	Data provided
1	Anatomy	Posterior aspect of globe	3	Drawing of globe
2	Pathology	Tumour histology	7	Photomicrographs
3	Pathology	Tumour histology	6	Photomicrographs
4	Optics*	Instruments	7	3 ray diagrams
5	Optics*	Chromatic aberration	5	None
6	Optics	Lenses	2	None
7	Investigations	OCT	5	OCT image
8	Investigations	TMVL	4	None
9	Investigations	Angiography	6	Angiogram images
10	Investigations	Biometry	7	IOL master printout
11	Investigations	Neuroimaging	5	MRI scan
12	Epidemiology	Screening	5	None

* Candidates are expected to draw a diagram as part of the answer

Statistics

Mean score:	68	(57%)
Median score:	71.5	(60%)
Standard deviation:	17.8	(14.8%)
Range of scores:	14-98	(12%-82%)
Reliability: Cronbach alpha	0.9	
Standard error of measurement:	5	
Pass mark derived from Standard Setting:	70	(58%)
Pass mark – 1 SEM	65	(54%)
Pass rate	55/102	(54%)

Distribution of scores (Table 8)

Range of marks	Distribution	Number
0-30	//	2
31-40	//// //	8
41-50	//// //	8
51-60	//// //// ////	15
61-70	//// //// // /	15
71-80	//// //// //// //// //// //	27
81-90	//// //// //// //// /	21
91-100	//// /	6
101-120		0
Total		102

Two examiners marked each question in the CRQ papers and the average mark from each was used to produce the candidate mark. Each question has a maximum possible 10 marks. Candidate performance was variable for each question, with mean, median, minimum and maximum scores (with standard deviations) of:

(Table 9)

Q	Subject	Mean	Median	Min	Max	SD
1	Anatomy	6.6	7	2	10	1.93
2	Pathology	4.1	4	0	8.5	2.26
3	Pathology	2.9	3	0	8	1.76
4	Optics	5.6	6.5	0	10	2.76
5	Optics	6.5	7.5	0	10	3.96
6	Optics	6.4	8	0	10	3.82
7	Investigations	7.8	8	0	10	1.53
8	Investigations	6.2	6.5	0	9	1.56
9	Investigations	5.2	5.5	1	8.5	1.76
10	Investigations	5.7	6	0	10	2.46
11	Investigations	6.2	7.5	1	9.5	2.41
12	Epidemiology	4.3	4.5	0	8.5	1.95

Candidates performed badly in or were particularly ill prepared for questions 2 and 3 (Pathology) and 12 (Epidemiology).

33% Item discrimination (ID) and facility (F) for each question and examiner:

(Table 10)

Q	Subject	33% ID Examiner B	F examiner B	33% ID examiner A	F examiner A
1	Anatomy	0.382	75	0.471	72
2	Pathology	0.353	16	0.559	59
3	Pathology	0.235	16	0.412	21
4	Optics	0.618	55	0.736	57
5	Optics	0.824	66	0.647	75
6	Optics	0.735	74	0.853	58
7	Investigations	0.294	89	0.088	99
8	Investigations	0.411	73	0.294	44
9	Investigations	0.441	50	0.412	67
10	Investigations	0.676	73	0.529	55
11	Investigations	0.382	75	0.559	69
12	Epidemiology	0.353	36	0.206	25

Questions 4, 5, 6 (optics) and 10 (biometry) were best able to discriminate between the poor and good candidates based upon their performance in the CRQ overall.

Standard setting

The borderline candidate method was used to identify the pass mark for the CRQ. The examiners who marked the CRQ paper were asked to allocate a mark according to the marking scheme provided and, in addition, class the candidate's performance as a pass, fail or borderline. The sum of each median borderline mark was used to produce the pass mark:

(Table 11)

	Topic	Examiners A				Examiners B			
		No. Fail	No. Border	No. Pass	Median Border	No. Fail	No. Border	No. Pass	Median Border
1	Anatomy	27	31	44	6	18	44	80	6
2	Pathology	54	15	33	4	78	11	13	7
3	Pathology	84	11	7	5	87	9	6	5
4	Optics	40	24	38	6	29	37	36	7
5	Optics	27	5	70	5	36	9	57	6
6	Optics	40	14	48	8	28	15	59	5
7	Investigations	3	8	91	5	9	17	76	7
8	Investigations	53	33	16	7	22	21	59	6
9	Investigations	45	25	32	5	56	27	19	6
10	Investigations	49	20	33	6	29	13	60	5
11	Investigations	33	11	58	6	27	3	72	5
12	Epidemiology	75	17	10	6	25	23	21	6
Total					69				71

Comparison between examiners (Table 12)

Q	Subject	Mean mark examiner B	Mean mark examiner A	Mean absolute difference	t test of difference	Correlation between marks	Correlation between global judgements
1	Anatomy	6.7	6.6	0.4	0.09	0.93	0.82
2	Pathology	3.9	4.2	0.75	0.001	0.89	0.68
3	Pathology	2.8	3.0	0.52	0.01	0.90	0.68
4	Optics	5.8	5.3	0.83	0.000	0.92	0.79
5	Optics	6.6	6.5	0.88	0.19	0.93	0.77
6	Optics	6.4	6.4	0.44	0.59	0.97	0.82
7	Investigations	8.3	7.4	1.14	0.000	0.80	0.52
8	Investigations	6.2	6.1	0.83	0.65	0.78	0.53
9	Investigations	5.4	5.0	0.66	0.000	0.90	0.65
10	Investigations	5.9	5.5	0.56	0.000	0.94	0.70
11	Investigations	6.3	6.2	0.75	0.65	0.90	0.84
12	Epidemiology	4.6	4.0	1.15	0.000	0.78	0.40

Comparison to previous years (Table 13)

	May 11	Oct 11	Jan 12	May 12	Oct 12	Jan 13	May 13
Mean score	55%	57%	47%	58%	52%	50%	57%
Median score	56%	58%	48%	60%	54%	52%	60%
Reliability	0.92	0.86	0.87	0.92	0.93	0.93	0.93
SEM	6	6	5	5	4.5	5	5
Pass mark	58%	56%	54%	58%	54%	53%	58%
Pass rate	64%	59%	26%	51%	52%	48%	54%
Correlation with MCQ	0.79	0.73	0.66	0.70	0.78	0.79	0.72

The correlation between the two parts of the examination remains at an acceptable level at 0.72.

Overall Results

To pass the Part 1 FRCOphth examination candidates are required to:

1. Obtain a combined mark from both papers that equals or exceeds the combined pass marks obtained by the standard setting exercise explained above.
2. Obtain a mark in both papers that equals or exceeds the pass mark minus 1 standard error of measurement for each paper.

A candidate is therefore allowed to compensate a poor performance in one paper by a very good performance in the other paper. They cannot compensate for an extremely poor performance in one paper whatever the combined mark.

The minimum mark required in order to meet standard 1 above for this examination was 139/240 (58%). The minimum mark required in each paper (to meet standard 2 above) was 64/120 in the MCQ paper and 65/120 in the CRQ paper.

58 candidates gained a total mark that met standard 1 above but four candidates failed to obtain the minimum mark required in the one of the papers and therefore failed the examination overall.

54 (53%) candidates passed the examination.

Distribution of scores (Table 14)

Range of marks	Distribution	Number
<60	//	2
61-70		0
71-80	/	1
81-90	////	4
91-100	//// //	7
101-110	//// ///	8
111-120	////	5
121-130	//// ////	10
131-140	//// // // //	12
141-150	//// //// //// ////	20
151-160	//// //// ////	14
161-170	//// ///	8
171-180	//// //	7
181-190	//	2
191-200	/	1
201-210	/	1
Total		102

Mean 136/240 (57%)

Median 142/240 (59%)

Range 41-203 (17-85%)

Comparison to previous years: (Table 15)

Examination	Candidates	Passed examination	% passed	MCQ pass mark %	CRQ pass mark %
Oct 2006	33	3	9	58	62
Jan 2007	24	4	16	60	43
May 2007	32	5	15	50	64
Oct 2007	56	13	23	51	59
Jan 2008	73	27	37	56	55
May 2008	66	16	24	57	48
Oct 2008	88	45	51	58	51
Jan 2009	79	37	47	61	57
July 2009	49	33	67	63	58
Oct 2009	101	56	56	62	56
Jan 2010	50	20	40	63	58
May 2010	79	31	39	60	57
Oct 2010	89	34	38	61	54
Jan 2011	62	23	37	59	58
May 2011	95	47	49	54	57
Oct 2011	122	63	52	56	56
Jan 2012	66	20	33	57	54
May 2012	104	53	51	56	58
Oct 2012	150	84	56	56	54
Jan 2013	91	47	52	57	53
May 2013	102	54	53	58	58

Cumulative pass rates (Table 16)

Month of examination	Candidates	Pass rate (%)
January	445	40
May	527	46
October	639	47
All examinations	1611	45

Breakdown of results by training (Table 17)

	Failed	Passed	Total
In OST	14	22	36
Not in OST	34	32	66
Total	48	54	102

These differences are not statistically significant (p=0.30)

Breakdown of results by deanery (Table 18)

Deanery	Failed	Passed	Total
East Midlands	0	1	1
East of England	1	1	2
East of Scotland	0	1	1
KSS	1	1	2
London	1	3	4
Mersey	5	1	6
North of Scotland	0	0	0
North Western	0	2	2
Northern	1	1	2
N Ireland	1	1	2
Oxford	0	2	2
Peninsula	0	0	0
South East of Scotland	1	0	1
Severn	0	1	1
Wales	0	1	1
Wessex	0	1	1
West Midlands	1	0	1
West of Scotland	1	5	6
Yorkshire	1	0	1
Total	14	22	36

Breakdown of results by stage of training (Table 19)

Stage (includes FTSTA)	Failed	Passed	Total
ST1	9	20	29
ST2	4	2	6
ST3	1 (LAT)	0	1
Total in OST	14	22	36

Breakdown of results by gender (Table 20)

	Failed	Passed	Total
Female	28	31	59
Male	19	23	42
Total	47	54	101

These differences are not statistically significant (p=0.84)

Breakdown of results by country of qualification (Table 21)

	Failed	Passed	Total
UK	19	27	46
Outside UK	29	27	56
Total	48	54	102

These differences are not statistically significant (p=0.32)

Breakdown of results by declared ethnicity (Table 22)

Ethnicity	Failed	Passed	Total
White	13	19	32
Non-white	35	35	70
Total	48	54	102

These differences are not statistically significant ($p=0.40$)

Breakdown of results by first language (Table 23)

	Failed	Passed	Total
English	17	37	54
Other	24	11	35
Unknown	7	6	13
Total	48	54	102

These differences are statistically significant ($p=0.001$)

Breakdown of results by number of attempts (Table 24)

Attempts	Failed	Passed	Total
1 (First)	26	38	64
2	11	10	21
3	6	3	9
4	3	3	6
5	1	0	1
6	0	0	0
7	0	0	0
8	0	0	0
9	0	0	0
10	1	0	1
Any resit	22	16	38
Total	48	54	102

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Appendix 1 Overall results for each deanery

Result data by deanery has been available since October 2010. The summary results for each deanery are listed below:

Deanery	Number of candidates	Pass rate
East Scotland	4	100
Yorkshire	27	78
N Scotland	7	71
KSS*	10	70
SE Scotland	11	64
Severn	11	64
Oxford	8	63
London	58	60
East Midlands	19	58
North Western	9	56
Wales	19	53
Northern	18	50
West Scotland	22	50
East of England	23	44
West Midlands	49	43
Wessex	37	38
Mersey	19	37
N Ireland	17	35
Peninsula	12	33
Total	380	52

*since August 2011

Appendix 2 Hofstee pass mark

The Hofstee technique is an alternative method of standard setting, which is employed in addition to the Ebel and BCM. The pass mark that is generated is not used to decide the pass list, but acts as a useful way of checking the pass rate and pass mark.

The technique requires the examiners to agree a maximum and minimum acceptable pass marks and a maximum and minimum fail rates. This has not, as yet, been applied to the Part 1 FRCOphth examination and the examiners values are therefore unknown. It is likely that the Part 1 examiners would agree similar values to those chosen by the examiners for the Part 2 written papers. These values are:

Maximum fail rate	50%
Minimum fail rate	20%
Maximum pass mark	65%
Minimum pass mark	50%

These values are then used to identify 2 coordinates on a plot of the fail rate against the pass mark for the examination. A line is drawn between the coordinates, which crosses the plot line. The pass mark is determined by dropping a line from the intersection to the X-axis as shown.

Using this method, the pass mark is 134/240 (56%), which is slightly lower than the pass mark identified using the Ebel and BCM standard setting techniques.

