Image Grading IQA

MONITORING GRADING PERFORMANCE WITHIN A DIABETIC EYE SCREENING PROGRAMME

Grade

noun:

a particular level of rank, quality, proficiency, or value

verb:

arrange in or allocate to grades; classify or sort

Grading

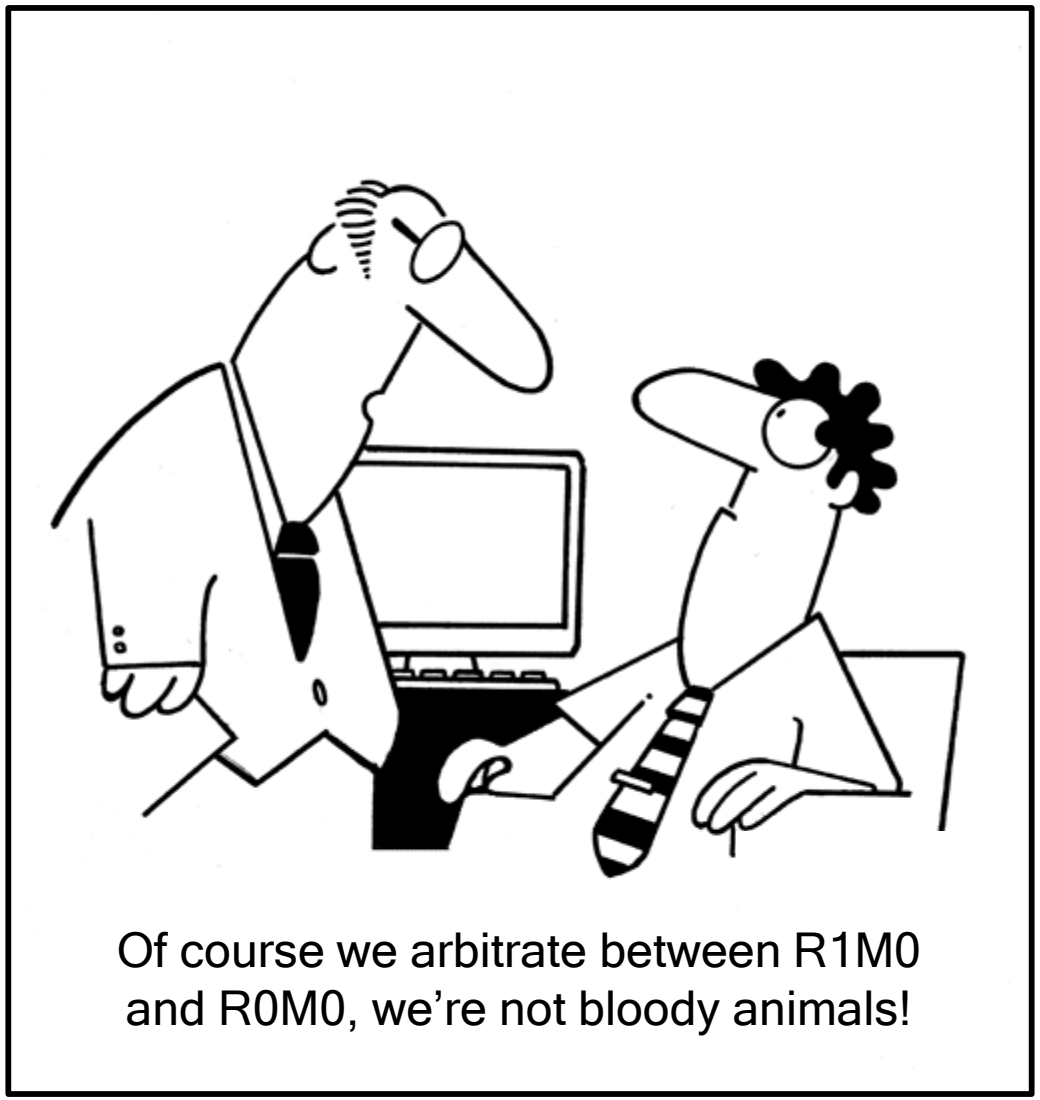
Grading determines the level of disease present according to the national classification system.

In the English National Programme the disease classification (grading) and management system was proposed by Harding *et al* (2003)[1].

Revised in 2012[2].

1. Grading and disease management in national screening for diabetic retinopathy in England and Wales. S. Harding, R. Greenwood, S. Aldington, J. Gibson, D. Owens, R. Taylor, E. Kohner, P. Scanlon, G. Leese and The Diabetic Retinopathy Grading and Disease Management Working Party. Diabetic Medicine Volume 20, Issue 12, pages 965–971, December 2003

2. Diabetic Eye Screening Revised Grading Definitions Version 1.3, 1 November 2012



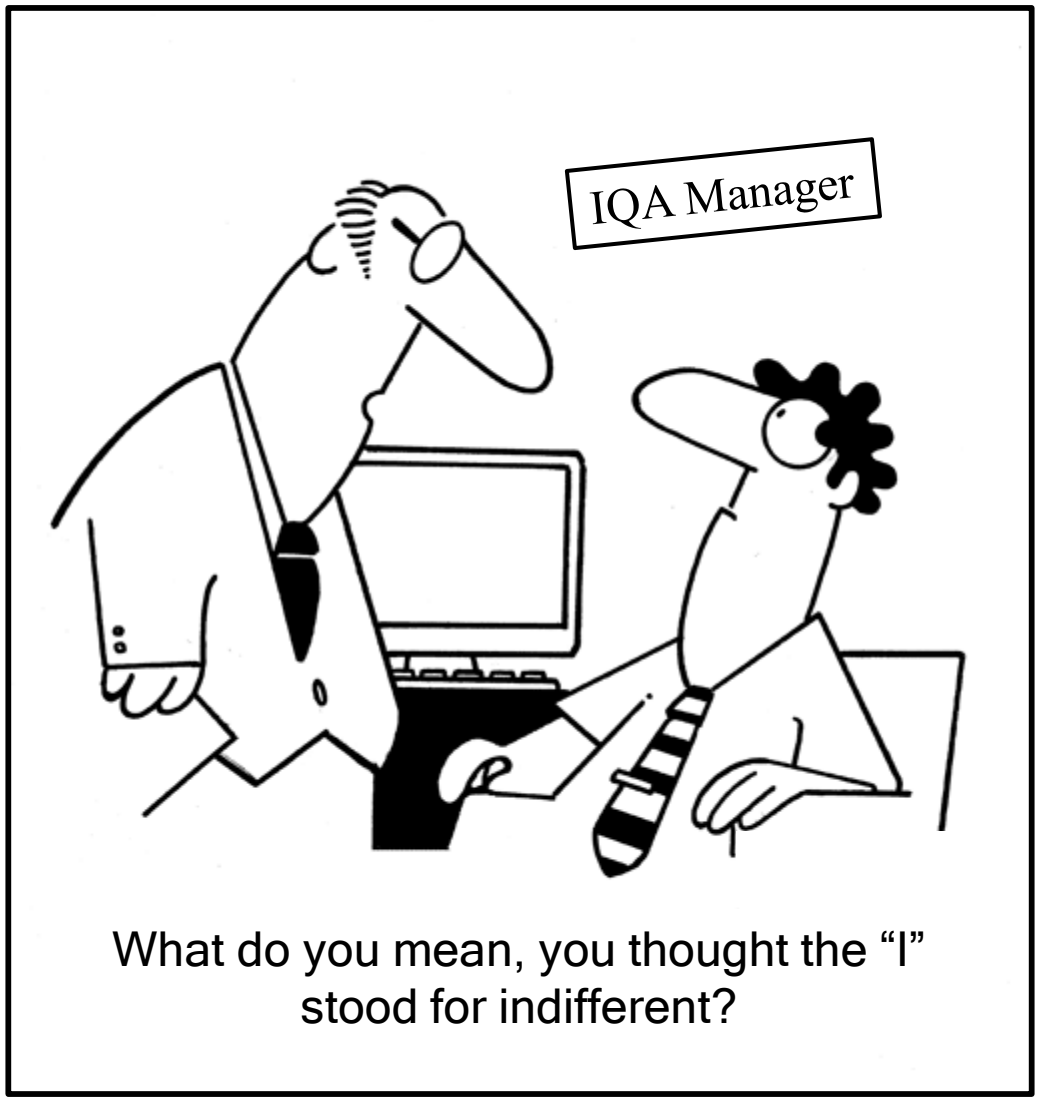
Of course we arbitrate between R1M0
and R0M0, we're not bloody animals!

Quality Assurance (QA)

noun:

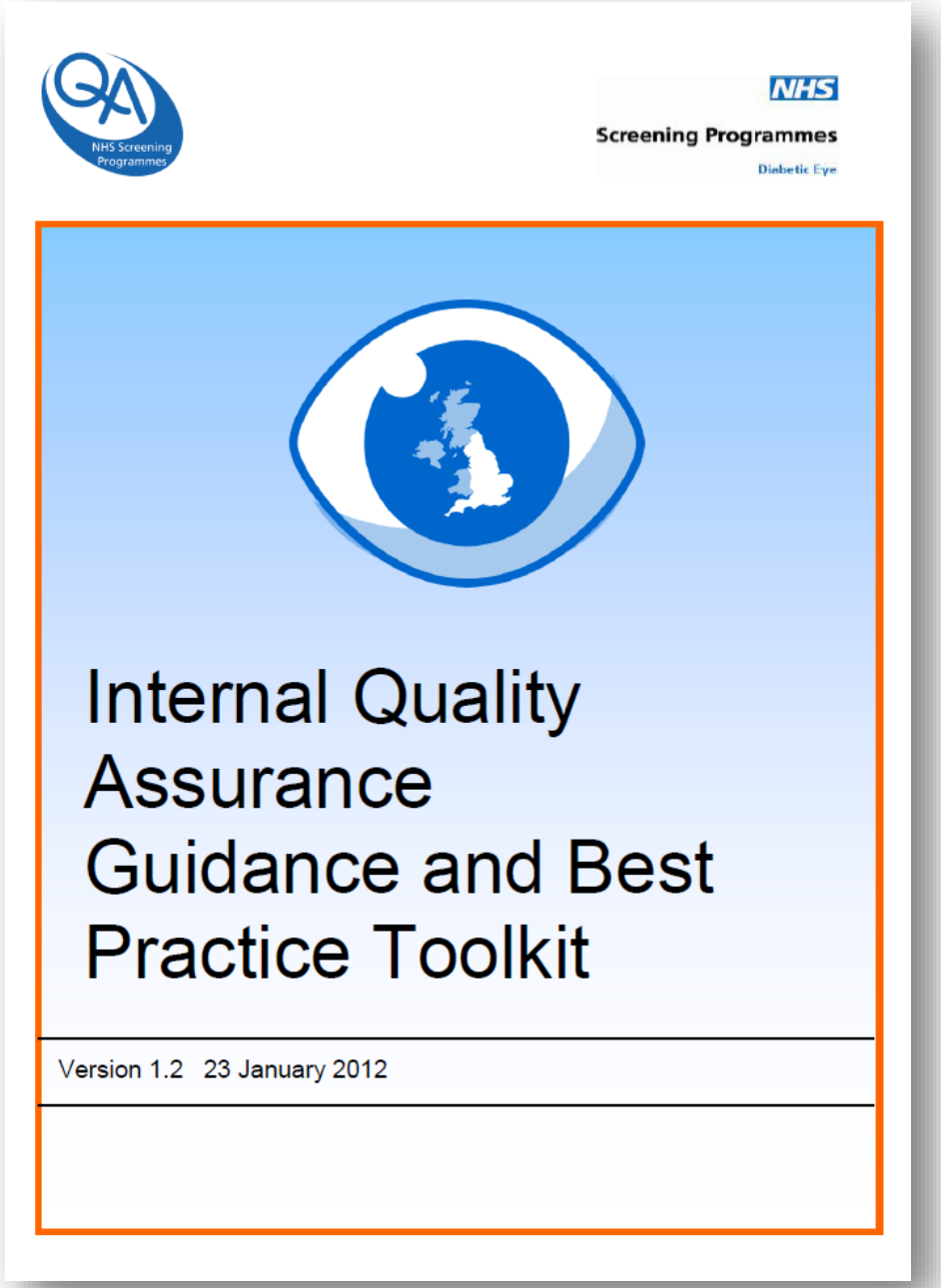
the maintenance of a desired level of quality in a service or product, especially by means of attention to every stage of the process of delivery or production.

Doing the right things right.


IQA Manager
What do you mean, you thought the “I” stood for indifferent?

IQA - Then

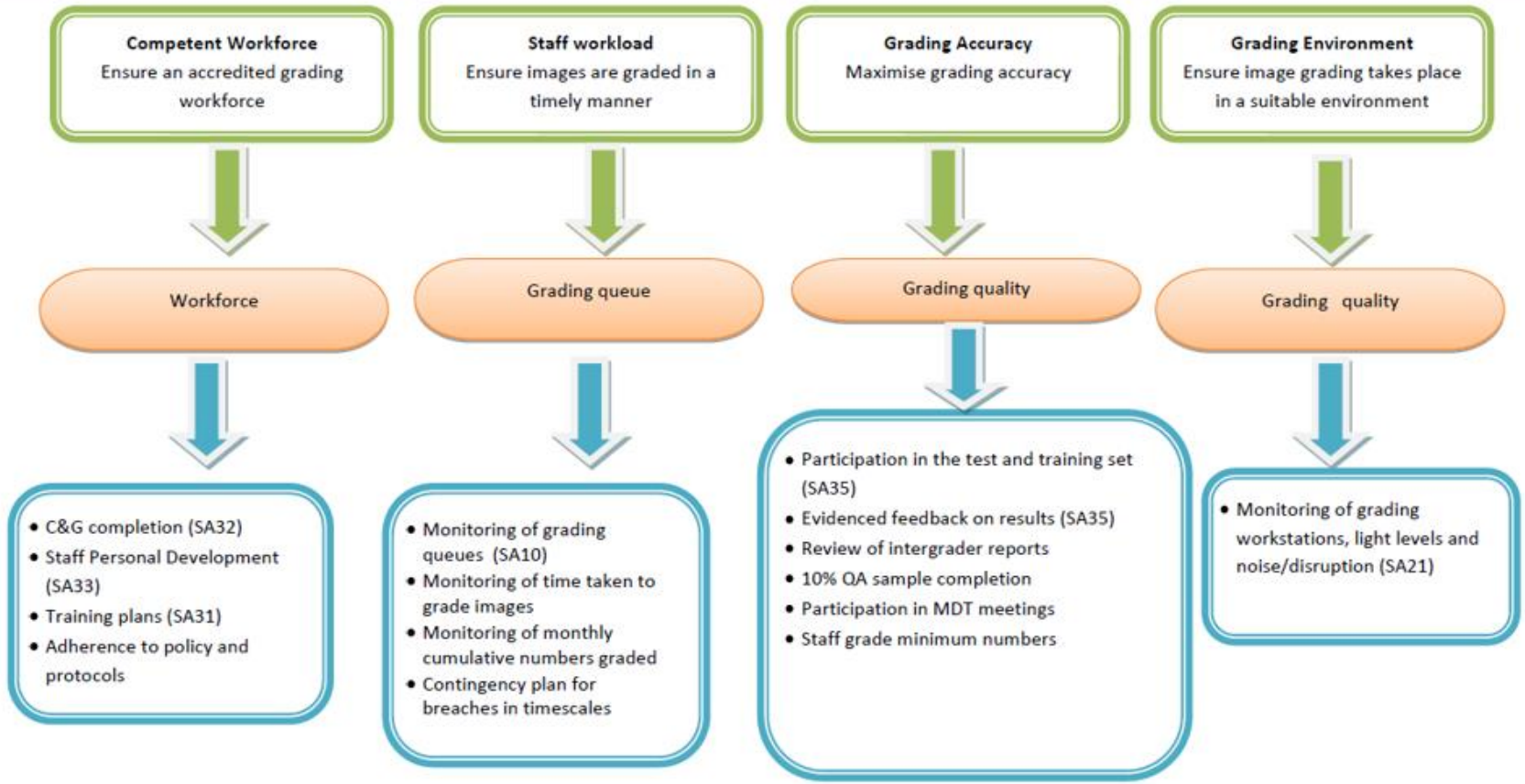
- Invitation
- Screening
- Grading
- SLB
- Results
- Referral & Treatment
- Outcomes
- Recall



Process Three: Grading

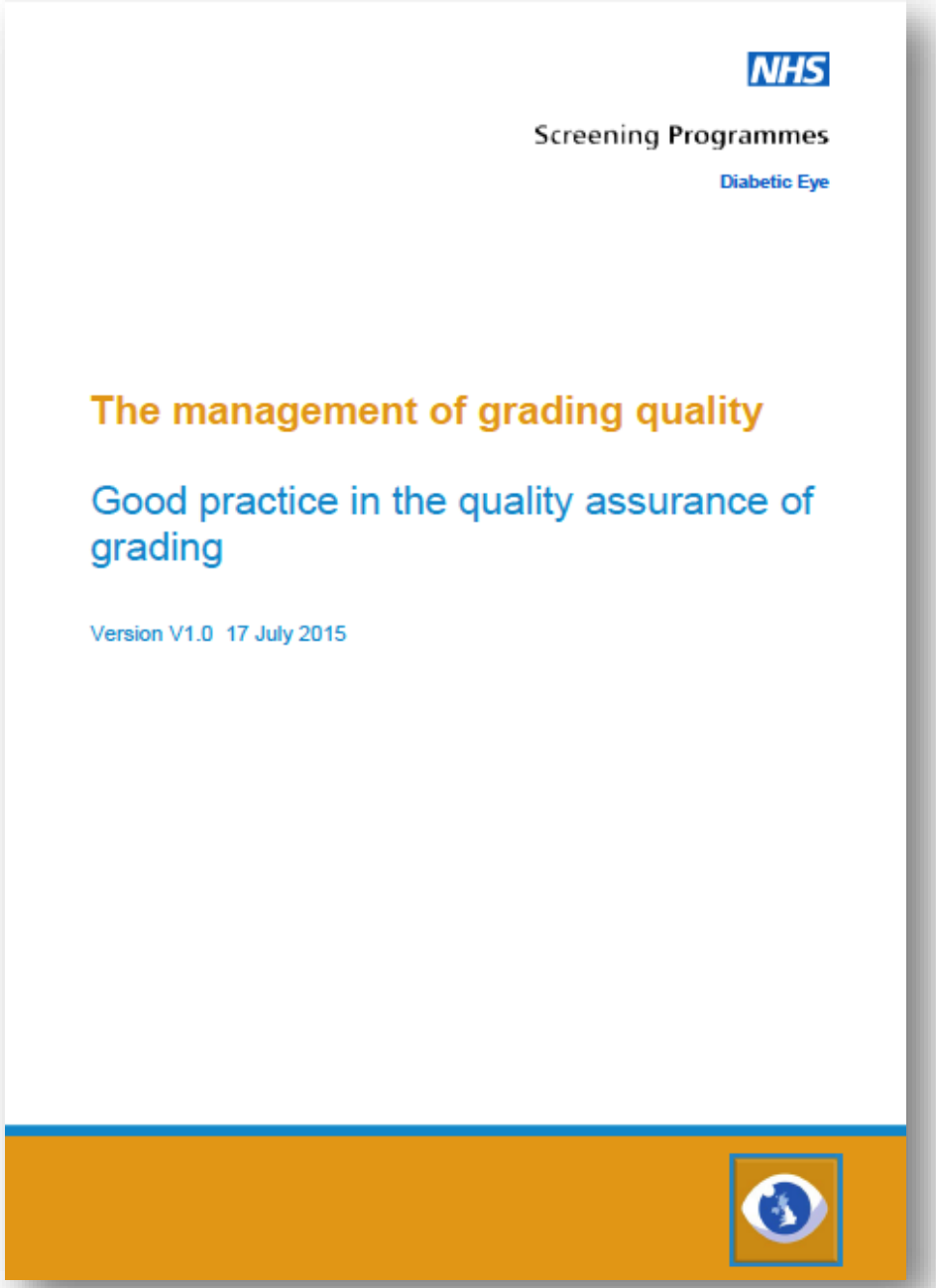
Objective: Ensure a high quality service of reliable image grading results for patients

QA standards:
Objective 5: To ensure grading is accurate
Objective 14: To ensure that screening and grading of retinal images are provided by a trained and competent workforce
Objective 15: To ensure optimum workload for **all** graders in order to maintain expertise



IQA - Now

- DESP boards should maintain a constant overview of grading and understand the reasons for any variance.
- Good IQA prevents harm to patients and ensures a safe and efficient service. National QA processes will check IQA for the control of grading.
- The programme responsible for grading quality assurance processes to provide quality care and meeting the standards.



Individual grader review

Item for review	**Criteria**
Test and training tests National standard	Minimum 10 test sets per annum and performance as defined by the flagging system
Grading numbers National standard	> 500 image sets per year for optometrist and > 1000 image sets for graders
IGA grading accuracy Good practice advisory	Grading accuracy > 80%
1/10 R0M0 QA report Good practice advisory	> 90% agreement

Information from these reports should be reviewed in conjunction with TAT reports to look for trends and similarities.

TITLE Grading Performance – Monitoring Procedure			
DOCUMENT ID:	CP018-03		
CCNo:	014		
ORIGINAL AUTHOR:	Grant Duncan	EFFECTIVE DATE:	22/06/15

1st Retinal Screen Limited

Brook House, 501 Crewe Road, Wheelock, Sandbach, Cheshire, CW11 3RX

Grading Performance – Monitoring Procedure

Clinical Protocol

MASTER

Authorised by:

Mike Nelson

Managing Director: .....

Date: .....

Paul Kinnear

Medical Director: .....

Date: .....

Kensington Chelsea & Westminster DESP

Online Test and Training Set Grader Feedback Form

Grader: 406
Reporting Period: Quarter One 2014/15

Scores

Although the online test and training set does not involve real patients and therefore no patients are placed at risk, it is important to analyse the scores as they can give insight into a grader's general performance and highlight areas where training may be required.

During this quarter you completed 3 training set, with an average score of 95% for Retinopathy and 95% for Maculopathy. It is important to note that the percentage score is only a small part of the test – it is possible to achieve a very high percentage score whilst at the same time downgrading an R3 case to R0. Further details for all the test sets this quarter, categorised by grade, are shown below.

R0	You correctly identified 14 out of a possible 16. This equates to a score of 87.5%. You overgraded 2 as R1, 0 as R2 and 0 as R3.
R1	**You correctly identified 35 out of a possible 35. This equates to a score of 100%. You undergraded 0 as R0, and overgraded 0 as R2 and 0 as R3**
R2	You correctly identified 2 out of a possible 2. This equates to a score of 100%. You undergraded 0 as R0 and 0 as R1, and overgraded 0 as R3.
R3	**You correctly identified 6 out of a possible 7. This equates to a score of 86%. You undergraded 0 as R0, 0 as R1, and 1 as R2.**
M0	You correctly identified 36 out of a possible 38. This equates to a score of 94.5%. You overgraded 2 as M1.
M1	**You correctly identified 21 out of a possible 22. This equates to a score of 95.5%. You undergraded 1 as M0.**
STDR	Total number of non-referable cases graded as referable: 2 out of 35 (5.5%) Total number of referable cases graded as non-referable: 1 out of 25 (4%)

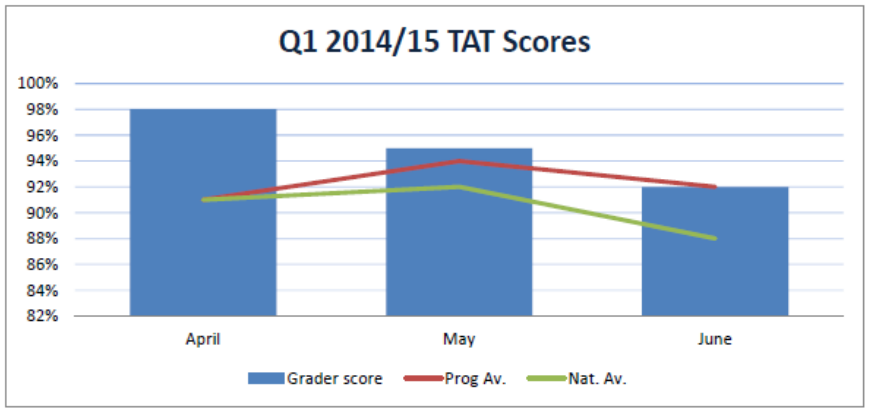
Sensitivity and Specificity

Sensitivity and specificity have been calculated below from the ten test sets previous to the end of the quarter. This allows there to be sufficient data to reliably calculate the figures. One should be aware that there will always be disagreements and that no grader is expected to achieve 100 %.

Please note that sensitivity and specificity figures have been calculated for sight threatening disease (R2, R3, M1).

Sensitivity	96%
Specificity	94.5 %

Below is a graph of your monthly TAT scores for the quarter, showing how they compare to your programme average and the national average.



Manager sign off: .....

Grader sign off: .....

Date: .....

10% R0M0 QA Rate by Grader

- Number of primary R0M0 cases final graded as disease positive
  - Non referable (R1M0)
  - Referable (U, R1M1, R2M0, R2M1, R3AM0 & R3AM1)

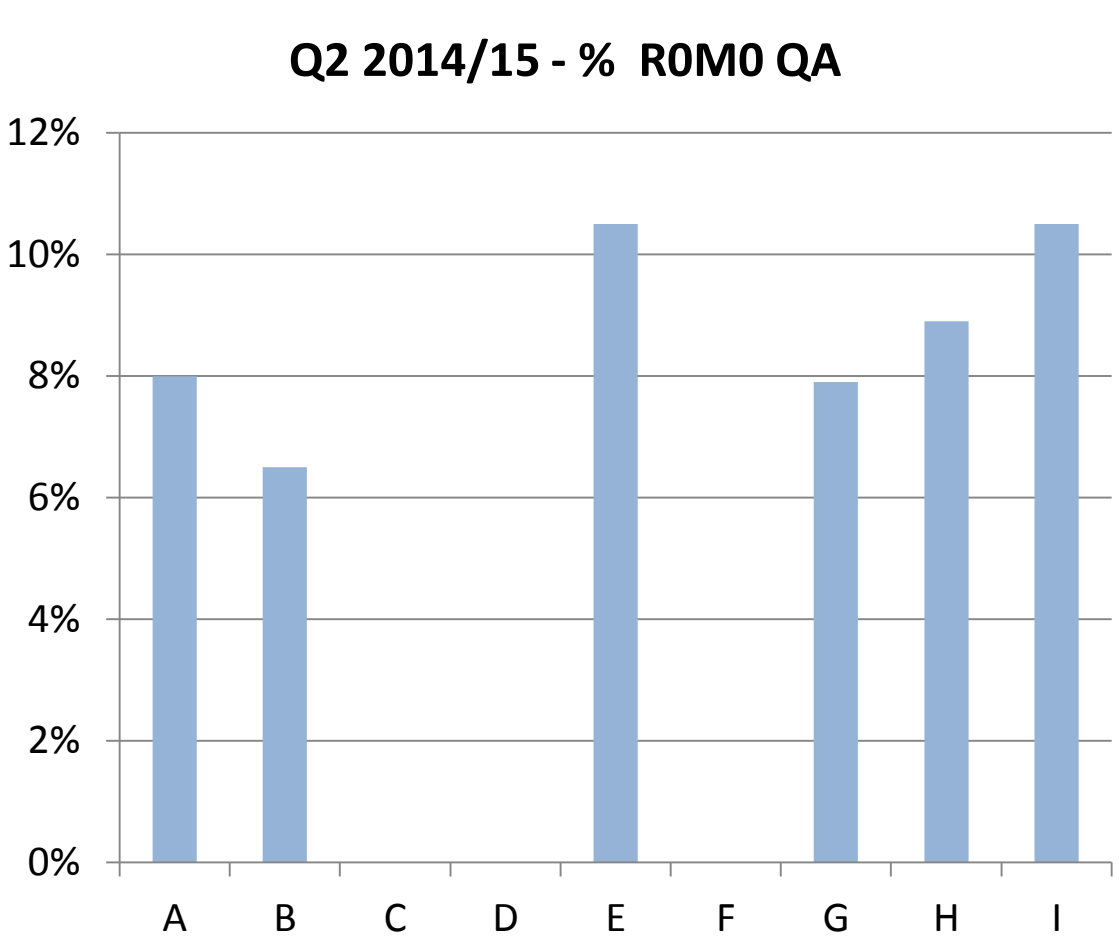
10% R0M0 QA By Grader

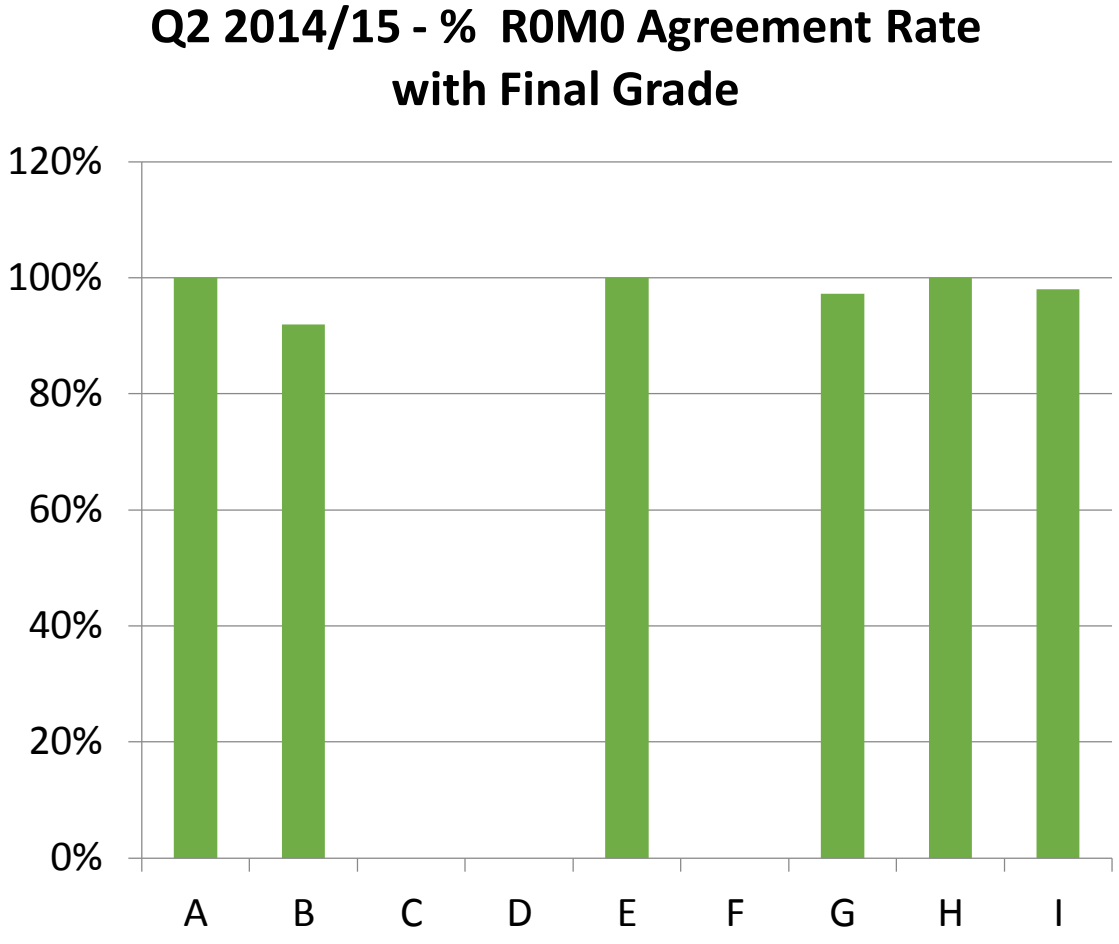
	Grader E	Programme
Number of R0M0 primary grades	460	1,890
Number of primary R0M0 grades QA	49 (10.5%)	174 (9.2%)
Number of these final graded as R0M0	49	171
Number of these final graded as R1M0	0	2
Number of these final graded as referable	0	1 (u)

	Grader B	Programme
Number of R0M0 primary grades	186	1,890
Number of primary R0M0 grades QA	12 (6.5%)	174 (9.2%)
Number of these final graded as R0M0	11	171
Number of these final graded as R1M0	1	2
Number of these final graded as referable	0	1 (u)


18 29 7 28 12 35 3 26 0 32 15 19 4 21 2 25 17 34 6 27 13 36 11 30 8 23 10 5 24 16 33 1 20 14 31 9

10% R0M0 QA By Grader





Kensington Chelsea & Westminster DESP

10% R0M0 QA Grader Feedback Form

Grader: 406
Reporting Period: Quarter Two 2014/15

1.0 Background

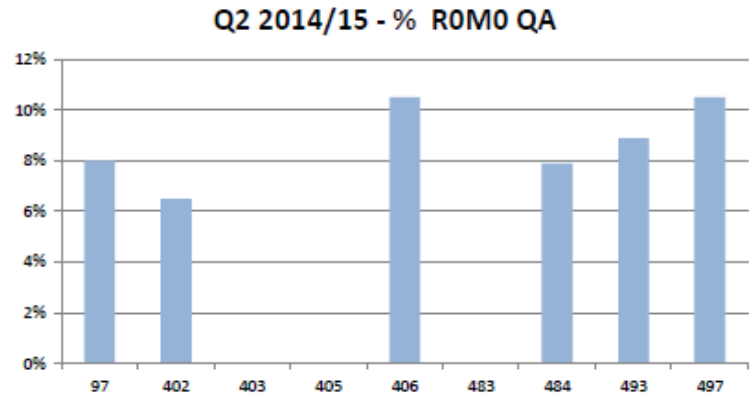
In any screening process it is important to maximise the effectiveness of the tests ability to detect true positive cases (sensitivity). In order to minimise the number of false negative cases it is important to apply some checking measure to those cases primary graded as R0M0. Obviously it is not practical to re-grade all such cases manually but some degree of quality assurance is essential. The guidance document ***Essential Elements in Developing a Diabetic Eye Screening Programme: Workbook Section 12: Quality Assurance, version 4.4 (Jan 2012)***, states the following -

> *It is necessary to monitor both disease negatives, to ensure that disease is not being missed, and disease positives, to minimise inappropriate referrals (and associated patient anxiety). The National Advisory group recommends that 10% of disease negative cases should be re-graded independently as part of the internal QA system. It is particularly important to have some quality assurance of disease negatives, as they will be returned to routine recall intervals.*

Therefore, as a quality assurance (QA) measure and as described in the 1st Retinal Screen policy document ***CP018-01 Grading Performance Monitoring Procedure*** a quarterly review of 10% of cases with a primary grade of R0M0 will be undertaken. This review will include details of individual grader performance compared with their peers and the programme average.

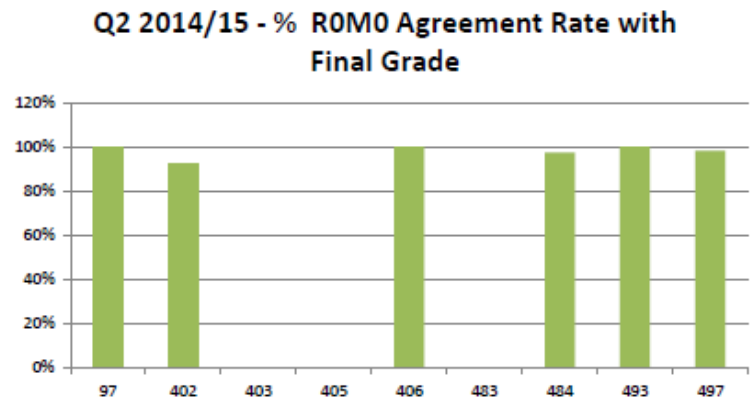
2.0 Individual Grader Performance

	Grader	Programme
Number of R0M0 primary grades	460	1,890
Number of primary R0M0 grades QA	49 (10.5%)	174 (9.2%)
Number of these final graded as R0M0	49	171
Number of these final graded as R1M0	0	2
Number of these final graded as referable	0	1 (u)



Review of "missed" referable (M1, R2, or R3)

NA



Manager sign off: .....

Grader sign off:

.....

Date: .....

Secondary Grading Rates

- Number of cases primary graded as disease positive plus 10% R0M0

Arbitration Grading Rates

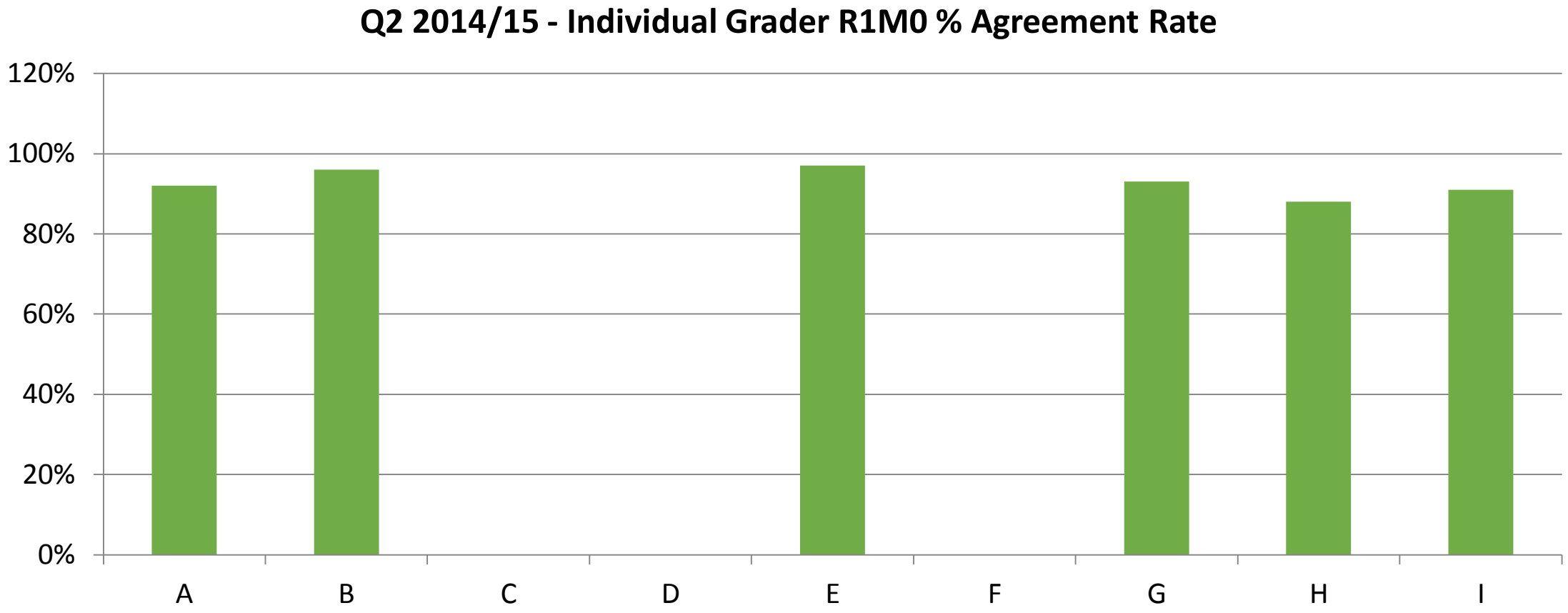
- Primary / secondary disagreement (including type of disagreement)
- Secondary / primary disagreement (including type of disagreement)

All Secondary & Arbitration Grading Rates

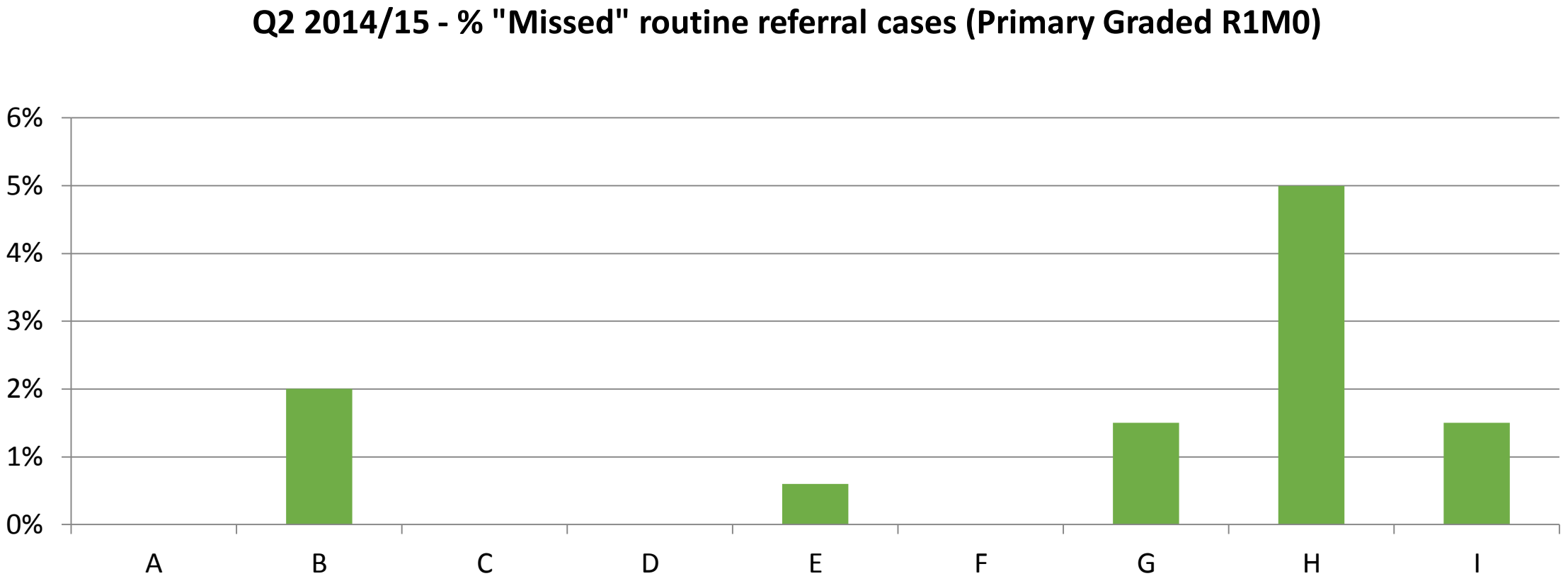
Grader	A	B	C	D	E	F	G	H	I	Prog
Number of Primary Grades	68	251	-	-	723	-	768	456	625	2,891
Number of primary grades subject to secondary grading	20 (29.4%)	70 (27.9%)	-	-	277 (38.3%)	-	302 (39.3%)	160 (35.1%)	207 (33.1%)	1,036 (35.8%)
Number of primary grades arbitrated	3 (4.4%)	13 (5.2%)	-	-	44 (6.1%)	-	65 (8.5%)	45 (9.9%)	36 (5.8%)	206 (7.1%)

Arbitration Grading Rates for Primary R1M0

Grader	A	B	C	D	E	F	G	H	I	Prog
Number of R1M0 primary grades	13	45	-	-	179	-	195	105	129	666
Number of R1M0 primary grades arbitrated	2 (15.4%)	7 (15.5%)	-	-	22 (12.3%)	-	25 (12.8%)	27 (25.7%)	25 (19.4%)	108 (16.2%)


Q2 2014/15 - Individual Grader R1M0 % Agreement Rate
120%
100%
80%
60%
40%
20%
0%
A
B
C
D
E
F
G
H
I

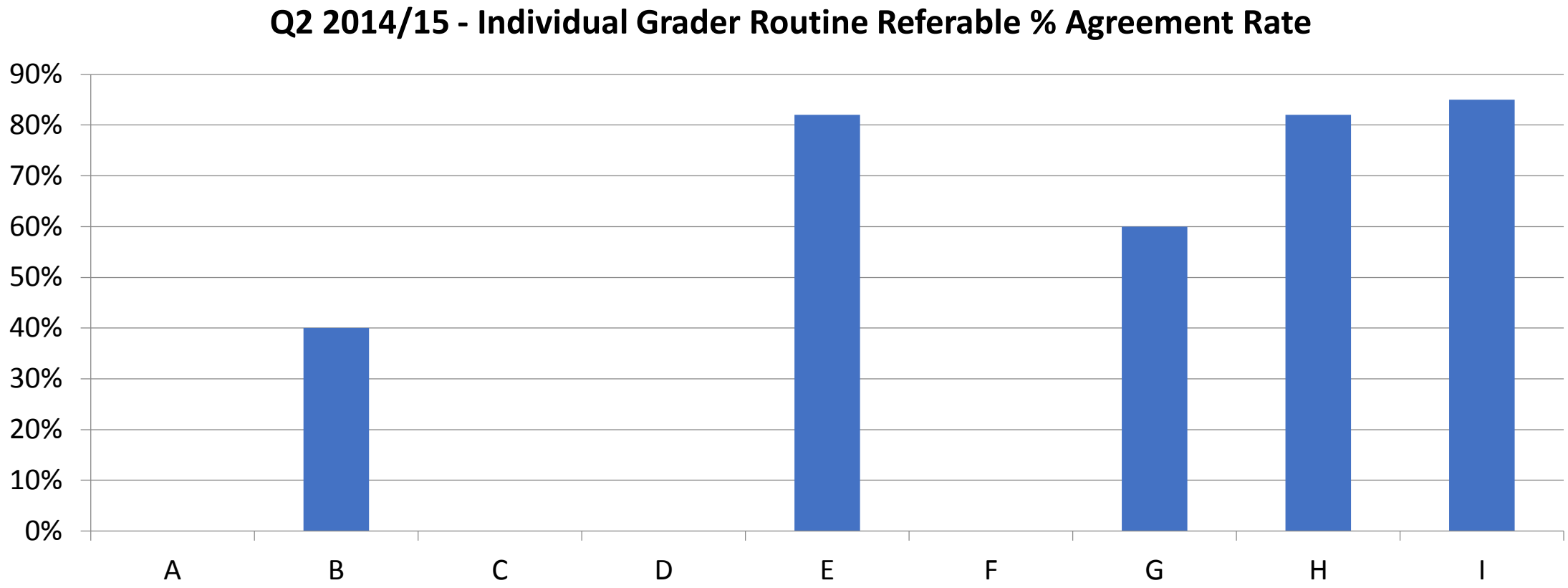
Grader	A	B	C	D	E	F	G	H	I	Prog
Number of R1M0 primary grades	13	45	-	-	179	-	195	105	129	666
Number of final graded R1M0 cases	12	43	-	-	173	-	181	92	117	618
Number of final graded as R0M0	1	1	-	-	5	-	10	7	9	33
Number of final graded as U	0	0	-	-	0	-	1	1	1	3 1267 9137 7954
Number of final graded as routine ref	0	1	-	-	1	-	3	5	2	12 5548 3737 0227 7096 1791 9787 8798 8048 7338 2426 5932 7579
Number of final graded as R3A	0	0	-	-	0	-	0	0		0
Number of final graded as R3S	0	0	-	-	0	-	0	0		0

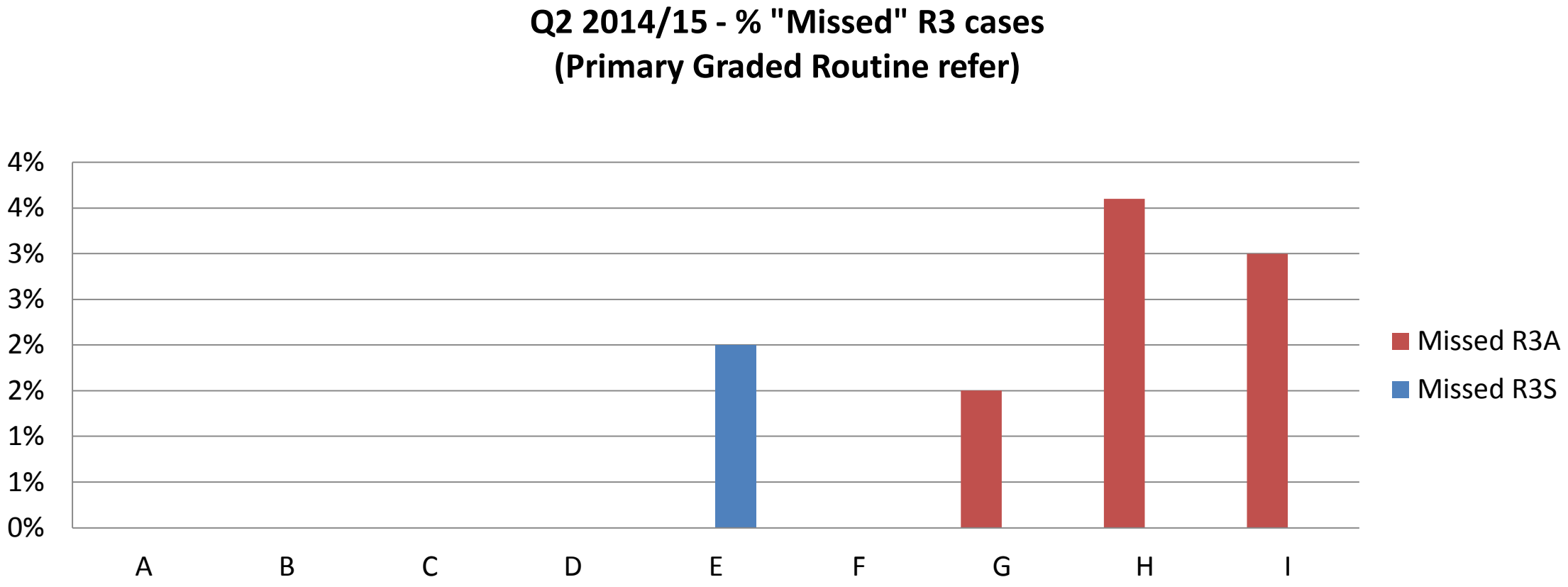

Q2 2014/15 - % "Missed" routine referral cases (Primary Graded R1M0)
6%
5%
4%
3%
2%
1%
0%
A
B
C
D
E
F
G
H
I

Arbitration Grading Rates for Referable Primary Grades

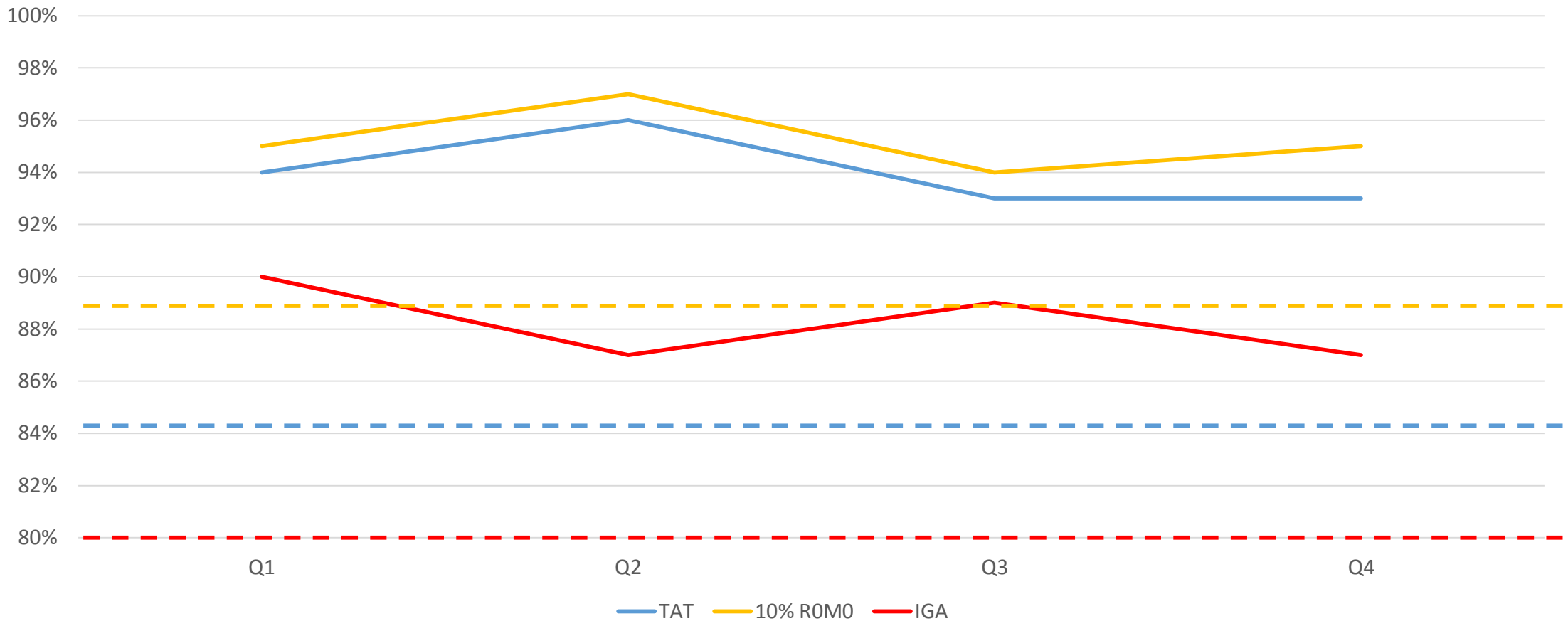
Grader	A	B	C	D	E	F	G	H	I	Prog
Number of routine referable primary grades	0	5	-	-	49	-	70	28	33	185
Number of routine referable primary grades arbitrated	0 (0%)	5 (100%)	-	-	17 (34.7%)	-	37 (52.9%)	14 (50%)	8 (24.2%)	81 (41.3%)

Grader	A	B	C	D	E	F	G	H	I	Prog
Number of routine referral level primary grades	0	5	-	-	49	-	70	28	33	185
Number of routine referral level final grades	0	2	-	-	40	-	42	23	28	135
Number of final graded as R0M0	0	0	-	-	1	-	7	1	1	10
Number of final graded as R1M0	0	3	-	-	7	-	18	3	2	33
Number of final graded as U	0	0	-	-	0	-	2	0	1	3 9685 7476 6777
Number of final graded as R3A	0	0	-	-	0	-	1	1	1	3 1432 4248
Number of final graded as R3S	0	0	-	-	1	-	0	0	0	1 6064


Q2 2014/15 - Individual Grader Routine Referable % Agreement Rate
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
A
B
C
D
E
F
G
H
I


Q2 2014/15 - % "Missed" R3 cases
(Primary Graded Routine refer)
4%
4%
3%
3%
2%
2%
1%
1%
0%
A
B
C
D
E
F
G
H
I
Missed R3A
Missed R3S

Individual Grader Combined Performance

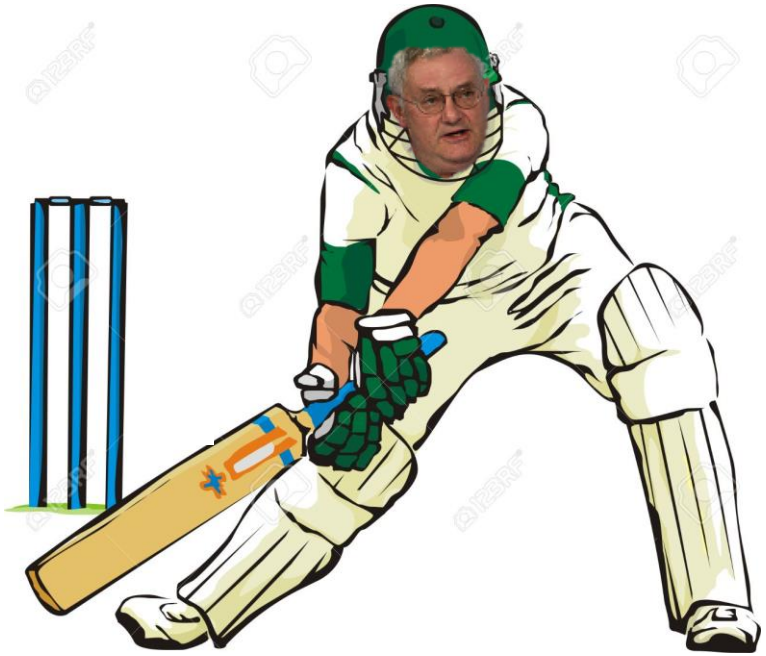


Additional IQA

- Validation of final grades against actual treatment records helps to tie in results from the whole grading structure and should be used when it is available. Even when data is not routinely collected, snapshot audits can give a good indication as to whether the service is performing well.

- Ungradable rates should be monitored to ensure that graders are not attempting to grade images where pathology could be hidden because of poor image quality. The standard for ungradable rates is currently under review. Programmes should be able to identify unusually high or low rates of ungradable referrals when comparing their norm year on year.

Different rules?



HES

DESP

Different game.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TIC EYE SCREENING PROGRAMME
What do you mean you just copied slides from old presentations and other peoples work?

Discussion?