UK NEQAS
Haematology and Transfusion

Abnormal Haemoglobins Scheme

Distribution: 2305AH **Date:** 02 Oct 2023

Laboratory:

Fraction Identification & Quantification

Performance Score

Survey Contents:

Specimen **2305AH1** Blood from a sickle cell carrier mixed with normal adult blood

Specimen **2305AH2** Blood from an adult donor with no haemoglobin variants present

Specimen **2305AH3** Blood from an adult donor, mixed with cord blood

Non Participation Penalty: 0

Specimen Quality

	2305AH1	2305AH2	2305AH3
Satisfactory	328	328	328
Unsatisfactory	1	1	1
You reported:	Satisfactory	Satisfactory	Satisfactory

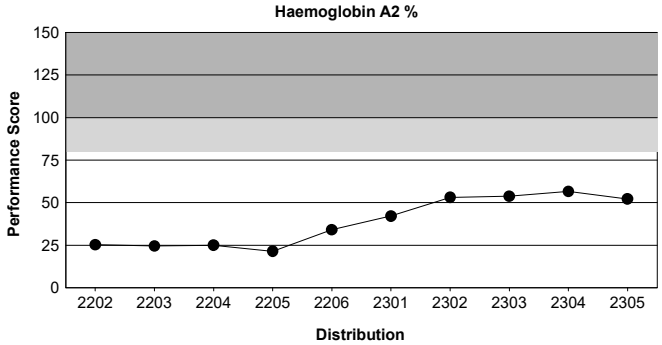
Return Rate

Specimens were distributed to 346 participants.
329 participants returned results.
This represents a 95% return rate.

PRN: 29766

Cumulative analytical performance

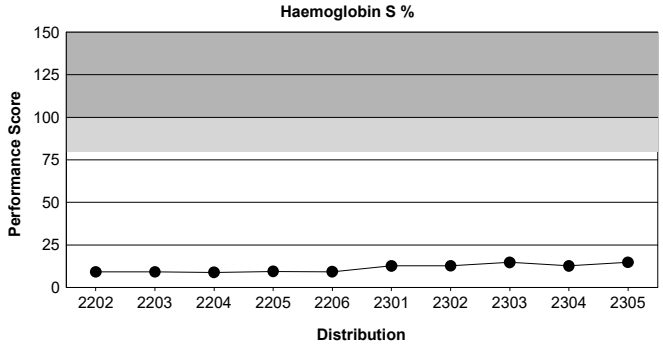
Your analytical performance score is 52.2



PRN: 29766

Cumulative analytical performance

Your analytical performance score is 14.8



For information on data analysis and performance assessment see the UK NEQAS Haematology Participants' Manual (www.ukneqash.org)

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Authorised by: Yvonne Hector (Service Manager)

UKAS PROFICIENCY TESTING
7805

Fraction identification

Fraction	Expected	Essential	Your Results	Reported by all participants
Hb A	Expected	Essential	Present	315
Hb A2	Expected		Present	317
Hb F	Expected		Present	225
Hb S	Expected	Essential	Present	316
Hb C			Absent	1
Hb D			Absent	0
Hb E			Absent	0
Hb C or E			Absent	0
Hb Non Specified Fraction			Absent	5

Performance summary for fraction identification

22 laboratories failed to report the fraction identification pattern essential for diagnosis.
Participants are asked to report all fractions present, including the expected ones (HbA, HbA2 & HbF).

Comments:
329 participants submitted results by the closing date. Three participants (1 UK) submitted a blank return and one (UK) laboratory reported just a non-specified fraction, giving 325 completed returns.
307/325 participants (94%) returned the haemoglobin pattern identified as essential for diagnosis (Hb A and Hb S).
Of the remaining 18 participants:

- 9 reported Hb S but failed to report Hb A present. Participants are reminded to report all fractions present, including Hb A, Hb A2 and Hb F.
- 3 failed to report Hb S present (or a non-specified fraction)
- 3 failed to report both Hb A and Hb S present
- 3 (2 UK) reported a non-specified fraction with Hb A. These participants may not identify abnormal haemoglobins locally but would refer the sample for further work.
- Two laboratories reported fractions in addition to the expected ones: one reported Hb C and one reported a non-specified fraction.

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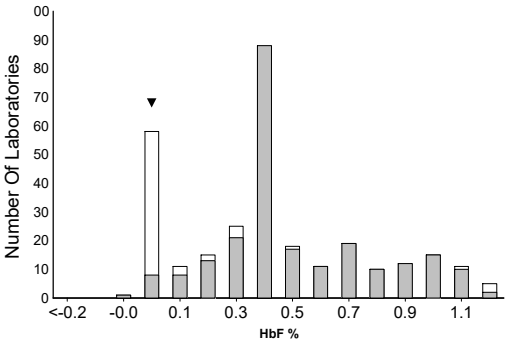
Fraction Quantitation

Haemoglobin F (%)

	n	Mean	GCV
All Methods	242	0.50	71.98
Capillary Electrophoresis	13	0.40	252.24
HPLC	228	0.50	65.60
Arkray HA-8180T	25	0.40	28.76
BioRad Variant II; Beta-thal short pro	81	0.40	11.45
BioRad Variant II; Dual program Kit	28	0.20	96.24
TOSOH G11	36	1.00	9.65
TOSOH G8	31	0.70	12.12



Your registered method is:
Your Result :

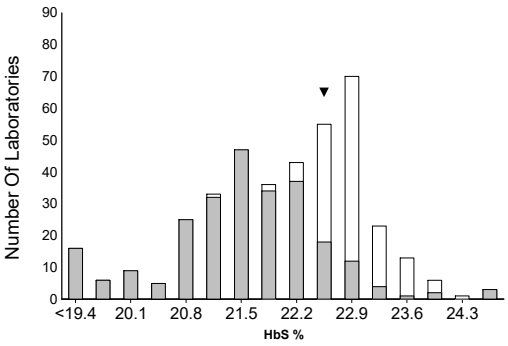
Reported Range (Overall)
Minimum -0.10
Maximum 5.40

Assessment vs your ref range
You reported: Normal

Overall Assessment (%)
Normal 97.7
High 2.0
Uncertain 0.3

Haemoglobin S (%)

	n	Mean	GCV
All Methods	391	21.9	4.87
Capillary Electrophoresis	136	22.7	1.73
Sebia Capillarys	19	22.7	2.16
Sebia Capillarys 2	39	22.6	1.18
Sebia Capillarys 3	50	22.8	1.52
Sebia Minicap	24	22.7	1.99
HPLC	251	21.4	4.50
Arkray HA-8180T	23	20.7	1.83
BioRad D10; Dual Program Kit	13	21.5	2.40
BioRad Variant II; Beta-thal short pro	80	21.6	3.78
BioRad Variant II; Dual program Kit	31	21.4	2.15
Hb9210 Resolution	17	22.5	3.75
TOSOH G11	37	20.6	6.84
TOSOH G8	31	21.5	4.43



Your registered method is:
Your Result : 22.5
DI : 0.46
Uncertainty of Method Mean :0.08
Perf Score : 14.8

Reported Range (Overall)
Minimum 0.00
Maximum 35.00

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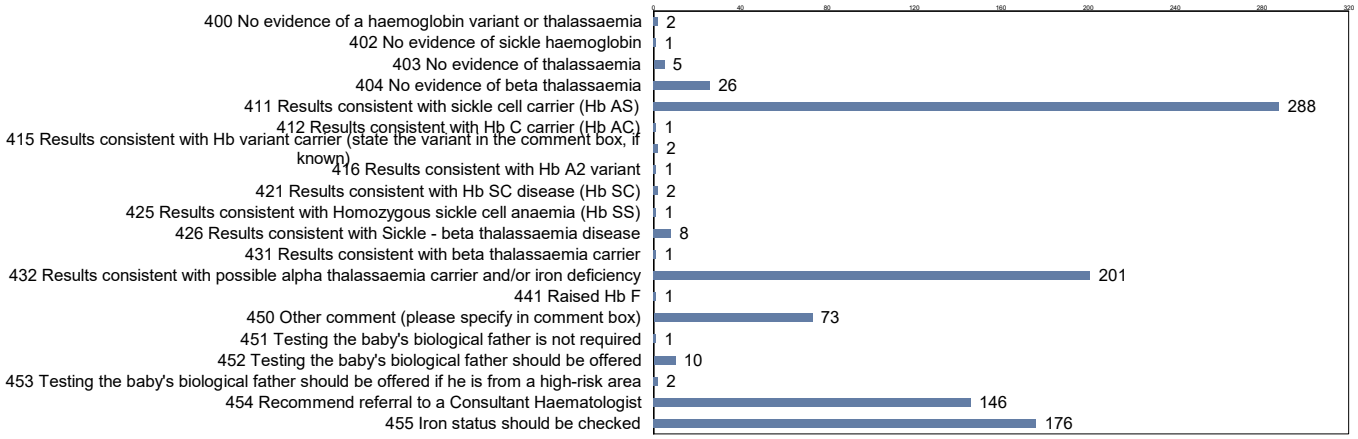
Interpretation

Sex	Male	RBC	(10^{12}/L)	5.5
Ethnic Origin	Mixed - Chinese/ African	Hb	(g/L)	99
Age	5	MCV	(fL)	52.7
	Patient being investigated for splenomegaly	MCH	(pg)	18.0

Analysis of Interpretation Codes reported by Participants



Data Analysis

Top five reported comments (see graph for all reported comments)

Code	Comment	Rank	Number
411	Results consistent with sickle cell carrier	1	288
432	Results consistent with possible alpha th	2	201
455	Iron status should be checked	3	176
454	Recommend referral to a Consultant Hae	4	146
450	Other comment (please specify in comm	5	73

Reported Comments

Your reported comments with the number of participants that reported the same comment

Code	Comment	Rank	Number
411	Results consistent with sickle cell carrier	1	288
450	Other comment (please specify in comm	5	73

Comments:

2305AH1 simulated a specimen from a 5-year-old male who was being investigated for splenomegaly. The child was of a mixed-ethnicity (Chinese and African). The patient had significantly reduced red cell indices (MCH = 18.0 pg) and haemoglobinopathy screening showed him to be a sickle cell carrier (Hb S all methods mean = 21.9%). As the Hb S% is much lower than expected in a typical sickle cell carrier and taking the child's ethnic origin into consideration, it is likely he is also an alpha zero thalassaemia carrier or may even have Hb H disease, but only molecular genetic testing could confirm this.

303 participants returned interpretive comments. 288/303 (95%) reported comment code 411 (results consistent with sickle cell carrier), and 201/303 (63%) reported code 432 (results consistent with possible alpha thalassaemia carrier and/or iron deficiency). Taking into account the coded and the free text comments 214/303 (71%) of participants suggested a sickle cell carrier with possible coexistent alpha thalassaemia carrier status.

A further 176/303 (58%) reported comment code 455 (iron status should be checked) and 146/303 (48%) used code 454 (recommend referral to a consultant haematologist).

There were some incorrect or inappropriate comments, including the use of codes 403 (no evidence of thalassaemia), 426 (results consistent with sickle-beta thalassaemia disease), and comments about "testing the baby's biological father".

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Fraction identification

Fraction	Expected	Essential	Your Results	Reported by all participants
Hb A	Expected	Essential	Present	315
Hb A2	Expected		Present	325
Hb F	Expected		Present	207
Hb S			Absent	4
Hb C			Absent	0
Hb D			Absent	0
Hb E			Absent	0
Hb C or E			Absent	0
Hb Non Specified Fraction			Absent	2

Performance summary for fraction identification

19 laboratories failed to report the fraction identification pattern essential for diagnosis.
Participants are asked to report all fractions present, including the expected ones (HbA, HbA2 & HbF).

Comments:

329 participants submitted results by the closing date. Three participants (1 UK) submitted a blank return and one (UK) laboratory reported just a non-specified fraction, giving 325 completed returns.
310/325 participants (95%) returned the haemoglobin pattern identified as essential for diagnosis (Hb A).
Of the remaining 15 participants:

- 10 failed to report Hb A present. Participants are reminded to report all fractions present, including Hb A, Hb A2 and Hb F.
- 4 reported Hb S in addition to the expected fractions.
- 1 reported a non-specified fraction in addition to the expected fractions.

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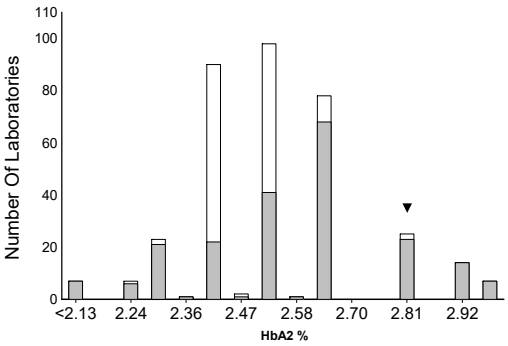
Fraction Quantitation

Haemoglobin A2 (%)

	n	Mean	GCV
All Methods	398	2.5	6.57
Capillary Electrophoresis	139	2.5	2.76
Sebia Capillarys	19	2.5	2.88
Sebia Capillarys 2	41	2.5	2.30
Sebia Capillarys 3	50	2.4	2.75
Sebia Minicap	25	2.5	3.60
HPLC	255	2.6	7.61
Arkray HA-8180T	25	2.8	6.00
BioRad D10; Dual Program Kit	13	2.8	11.26
BioRad Variant II; Beta-thal short pro	81	2.6	4.21
BioRad Variant II; Dual program Kit	31	2.4	7.06
Hb9210 Resolution	18	2.7	9.07
TOSOH G11	36	2.5	4.60
TOSOH G8	30	2.4	8.13

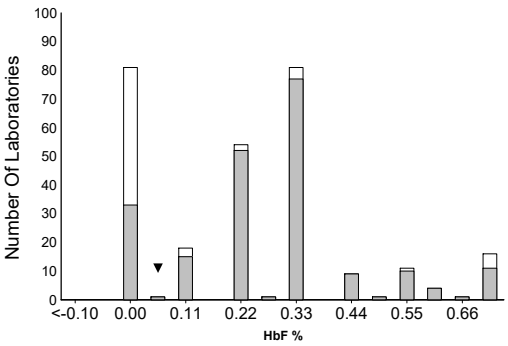


Your registered method is:

Your Result :	2.8
DI :	1.65
Uncertainty of Method Mean :0.08	
Perf Score :	52.2
Reported Range (Overall)	
Minimum	0.40
Maximum	3.40
Assessment vs your ref range	
You reported:	Normal
Overall Assessment (%)	
Low	1.5
Normal	98.5
High	
Uncertain	

Haemoglobin F (%)

	n	Mean	GCV
All Methods	197	0.30	59.55
Capillary Electrophoresis	14	0.40	395.85
HPLC	182	0.30	53.18
Arkray HA-8180T	21	0.20	76.35
BioRad Variant II; Beta-thal short pro	80	0.30	16.86
BioRad Variant II; Dual program Kit	13	0.20	175.29
TOSOH G11	12	0.50	69.92
TOSOH G8	29	0.30	38.55



Your registered method is:

Your Result :	0.01
Reported Range (Overall)	
Minimum	0.00
Maximum	4.40
Assessment vs your ref range	
You reported:	Normal
Overall Assessment (%)	
Normal	97.3
High	1.5
Uncertain	1.2

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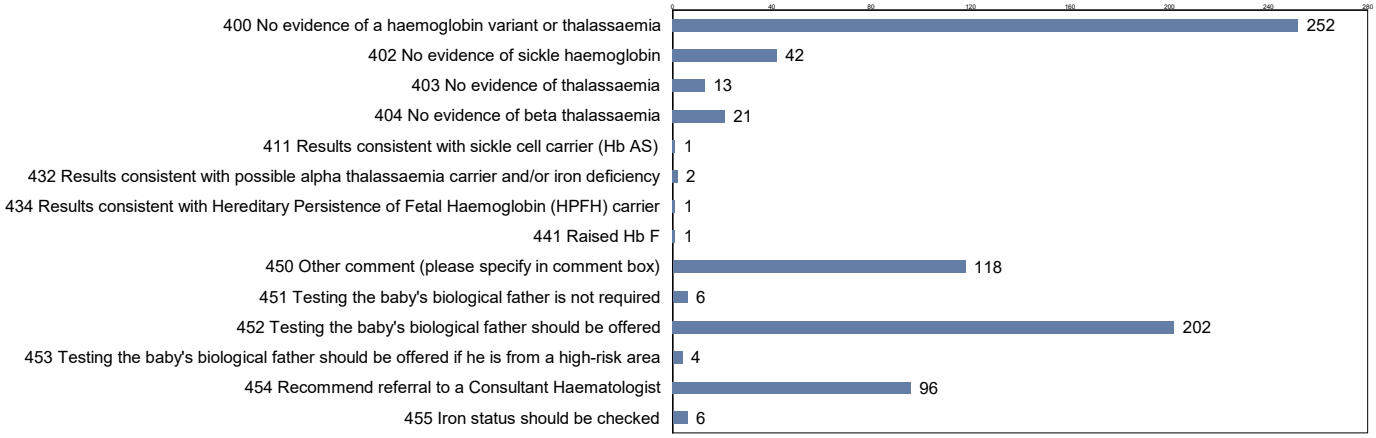
Interpretation

Sex	Female	RBC	(10^{12}/L)	4.43
Ethnic Origin	Greek Cypriot	Hb	(g/L)	123
Age	29	MCV	(fL)	98.2
	Antenatal screening (Had a BMT in childhood for beta thalassaemia m	MCH	(pg)	27.8

Analysis of Interpretation Codes reported by Participants



Data Analysis

Top five reported comments (see graph for all reported comments)

Code	Comment	Rank	Number
400	No evidence of a haemoglobin variant or	1	252
452	Testing the baby's biological father shoul	2	202
450	Other comment (please specify in comm	3	118
454	Recommend referral to a Consultant Hae	4	96
402	No evidence of sickle haemoglobin	5	42

Report Comments

Your reported comments with the number of participants that reported the same comment

Code	Comment	Rank	Number
400	No evidence of a haemoglobin variant or	1	252

Comments:

2305AH2 simulated a specimen from a 29-year-old Greek Cypriot lady undergoing antenatal screening. The clinical information provided stated she had a bone marrow transplant in childhood due to beta thalassaemia major. Red cell indices and haemoglobinopathy screening was normal. Due to her historical BMT, the phenotype of this lady will not be reflective of her actual genotype and therefore the NHS England National Sickle and Thalassaemia Programme Laboratory Handbook advises that testing the baby's biological father is required, especially since the clinical details state she had beta thalassaemia major which means her pregnancy is automatically high risk for a haemoglobinopathy.

303 participants returned interpretive comments. 252/303 (83%) reported code 400 (no evidence of haemoglobin variant or thalassaemia). 206/303 (68%) recommended testing the baby's biological father using codes 452 or 453. Taking both coded and free text comments into account, 220/303 (73%) noted that the results did not reflect the woman's genotype and/or that the baby's biological father should be tested.

6 participants (1 UK) reported code 451 (testing the baby's biological father is not required) which is incorrect.

There were some other incorrect or inappropriate comments, including the use of codes 432 (results consistent with possible alpha thalassaemia carrier and/or iron deficiency), 441 (raised Hb F) and 434 (results consistent with HPFH carrier).

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Fraction identification

Fraction	Expected	Essential	Your Results	Reported by all participants
Hb A	Expected	Essential	Present	314
Hb A2	Expected		Present	324
Hb F	Expected	Essential	Present	318
Hb S			Absent	3
Hb C			Absent	0
Hb D			Absent	0
Hb E			Absent	0
Hb C or E			Absent	0
Hb Non Specified Fraction			Absent	3

Performance summary for fraction identification

24 laboratories failed to report the fraction identification pattern essential for diagnosis.
Participants are asked to report all fractions present, including the expected ones (HbA, HbA2 & HbF).

Comments:

329 participants submitted results by the closing date. Three participants (1 UK) submitted a blank return and two (1 UK) reported just a non-specified fraction, giving 324 completed returns.
306/325 participants (94%) returned the haemoglobin pattern identified as essential for diagnosis (Hb A and Hb F).
Of the remaining 19 participants:

- 10 failed to report Hb A present. Participants are reminded to report all fractions present, including Hb A, Hb A2 and Hb F. All 10 reported Hb F present.
- 5 (2 UK) failed to report Hb F present.
- 1 reported Hb S alongside Hb A and Hb A2, but no Hb F.
- 2 reported Hb S in addition to the expected fractions.
- 1 reported a non-specified fraction in addition to the expected fractions.

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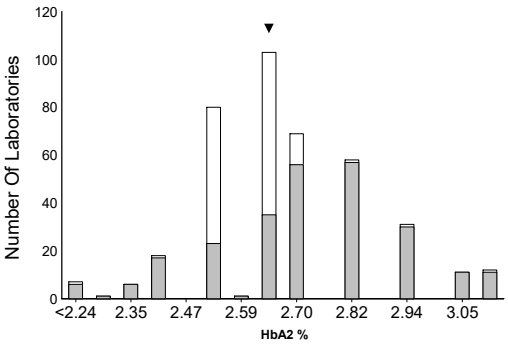
Fraction Quantitation

Haemoglobin A2 (%)

	n	Mean	GCV
All Methods	397	2.6	6.51
Capillary Electrophoresis	139	2.6	2.68
Sebia Capillarys	19	2.6	3.13
Sebia Capillarys 2	40	2.6	2.21
Sebia Capillarys 3	51	2.6	2.15
Sebia Minicap	25	2.6	3.49
HPLC	254	2.7	7.41
Arkray HA-8180T	25	2.9	5.98
BioRad D10; Dual Program Kit	13	2.9	11.45
BioRad Variant II; Beta-thal short pro	80	2.8	3.64
BioRad Variant II; Dual program Kit	31	2.5	6.24
Hb9210 Resolution	18	2.8	6.67
TOSOH G11	36	2.6	5.47
TOSOH G8	30	2.6	8.24

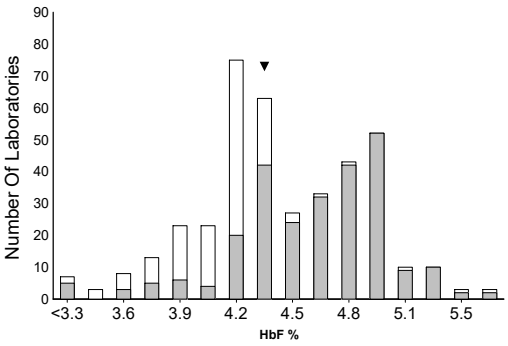


Your registered method is:

Your Result :	2.6
DI :	-0.30
Uncertainty of Method Mean :0.08	
Perf Score :	52.2
Reported Range (Overall)	
Minimum	1.70
Maximum	5.30
Assessment vs your ref range	
You reported:	Normal
Overall Assessment (%)	
Low	0.8
Normal	98.7
High	0.5
Uncertain	

Haemoglobin F (%)

	n	Mean	GCV
All Methods	395	4.4	11.13
Capillary Electrophoresis	135	4.1	5.95
Sebia Capillarys	19	4.1	4.87
Sebia Capillarys 2	40	4.1	4.96
Sebia Capillarys 3	49	4.1	5.22
Sebia Minicap	23	3.8	7.69
HPLC	257	4.6	8.73
Arkray HA-8180T	25	4.9	5.19
BioRad D10; Dual Program Kit	13	4.1	3.81
BioRad Variant II; Beta-thal short pro	80	4.5	7.22
BioRad Variant II; Dual program Kit	31	4.4	2.76
Hb9210 Resolution	18	5.1	3.81
TOSOH G11	37	4.9	2.37
TOSOH G8	30	4.7	3.35



Your registered method is:

Your Result :	4.4
Uncertainty of Method Mean :0.08	
Reported Range (Overall)	
Minimum	0.00
Maximum	5.90
Assessment vs your ref range	
You reported:	High
Overall Assessment (%)	
Normal	4.8
High	94.9
Uncertain	0.3

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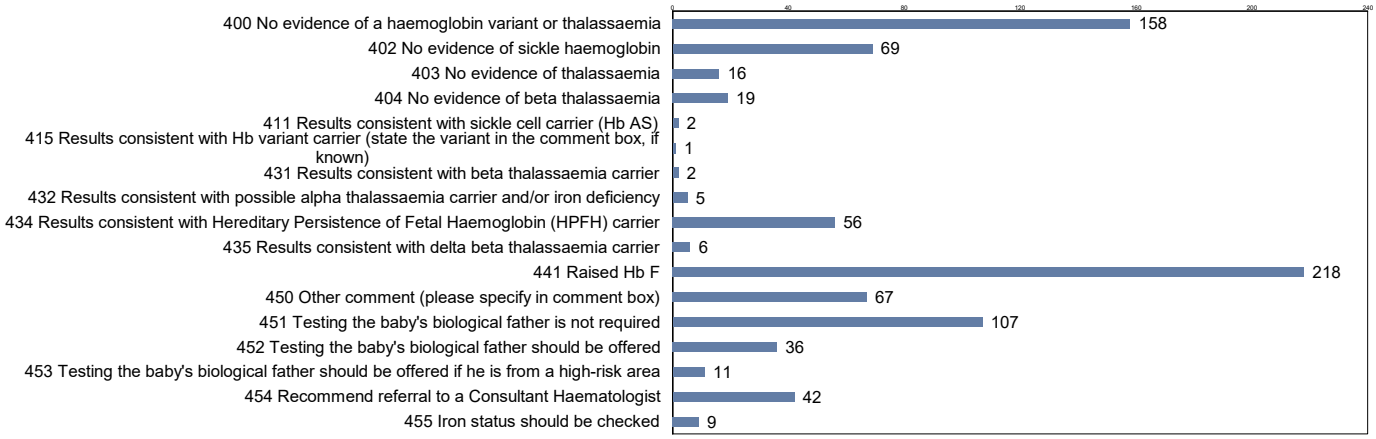
Interpretation

Sex	Female	RBC	(10^{12}/L)	4.31
Ethnic Origin	African	Hb	(g/L)	119
Age	36	MCV	(fL)	93.0
	Antenatal screening	MCH	(pg)	27.6

Analysis of Interpretation Codes reported by Participants



Data Analysis

Top five reported comments (see graph for all reported comments)

Code	Comment	Rank	Number
441	Raised Hb F	1	218
400	No evidence of a haemoglobin variant or	2	158
451	Testing the baby's biological father is not	3	107
402	No evidence of sickle haemoglobin	4	69
450	Other comment (please specify in comm	5	67

Reported Comments

Your reported comments with the number of participants that reported the same comment

Code	Comment	Rank	Number
441	Raised Hb F	1	218
450	Other comment (please specify in comm	5	67

Comments:

2305AH3 simulated a specimen from a 36 year old African lady undergoing antenatal screening. The patient's red cell indices were normal and the haemoglobinopathy screen showed her to have a raised Hb F (all methods mean = 4.4%). As the patient has normal red cell indices (MCH>27pg), normal Hb A2% and the Hb F% is <10%, the NHS England National Sickle and Thalassaemia Programme Laboratory Handbook advises that testing the baby 's biological father is not required.

299 participants returned interpretive comments. 218/299 (73%) reported code 441 (raised Hb F) and 158/299 (53%) reported code 400 (no evidence of haemoglobin variant or thalassaemia).

Only 107/299 (36%) laboratories used code 451 (testing the baby's biological father is not required).

There were a small number of labs (47 participants) that used codes 452 and 453 to recommend testing the baby's biological father which was not necessary in this instance.

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Survey Contents:

Specimen **2305LN1** Umbilical cord blood spiked with Hb SS blood

Specimen **2305LN2** Umbilical cord blood spiked with Hb SS blood

Non Participation Penalty: 0

Specimen Quality

	2305LN1	2305LN2
Satisfactory	40	40
Unsatisfactory	0	0
You reported:	Satisfactory	Satisfactory

Return Rate

Specimens were distributed to 41 participants.
40 participants returned results.
This represents a 97% return rate.

For information on data analysis and performance assessment see the UK NEQAS Haematology Participants' Manual (www.ukneqash.org)
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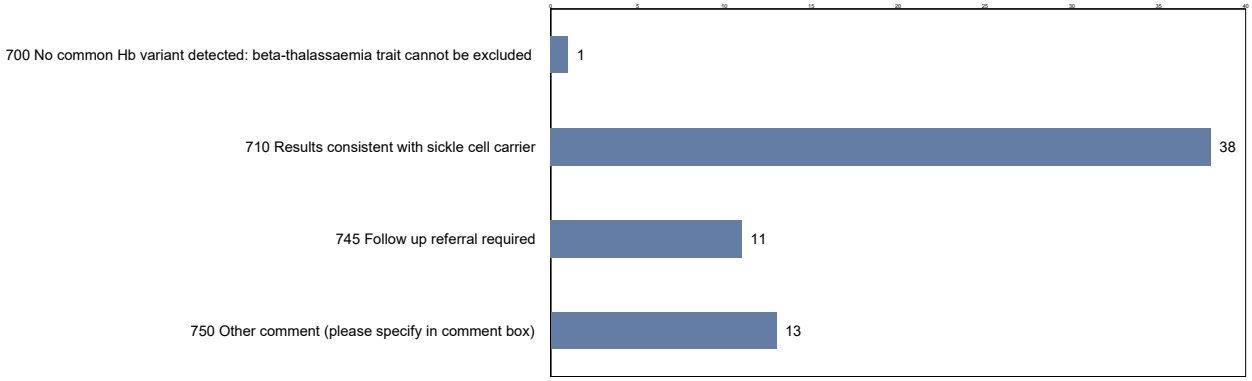
Sex	Female	RBC	(10^{12}/L)	5.14
Ethnic Origin	African	Hb	(g/L)	165
Age	24 hours	MCV	(fL)	107.2
	Father has sickle cell disease	MCH	(pg)	32.1

Fraction Identification

Fraction	Expected	Essential	Your Results	Reported by all participants
Hb F	Expected	Essential	Present	39
Hb A	Expected	Essential	Present	39
Hb S	Expected	Essential	Present	39
Hb C			Absent	0
Hb D			Absent	0
Hb E			Absent	0
Hb C or E			Absent	0
Hb Non Specified			Absent	0

Analysis of Interpretation Codes



Data Analysis

Top five reported comments (see graph for all reported comments)

Code	Comment	Rank	Number
710	Results consistent with sickle cell carrier	1	38
750	Other comment (please specify in comm	2	13
745	Follow up referral required	3	11
700	No common Hb variant detected: beta-th	4	1

Reported Comments

Your reported comments with the number of participants that reported the same comment

Code	Comment	Rank	Number
710	Results consistent with sickle cell carrier	1	38

Comments:

2305LN1 simulated a specimen from a newborn, African, female infant. The baby's father has sickle cell disease. Haemoglobinopathy analysis indicated the presence of Hb F, Hb A and Hb S.
Specimens were distributed to 41 participants and 40 (97%) returned results.
39/40 (98%) reported the expected fractions (Hb F, Hb A and Hb S). The remaining 1 reported a blank result.
38/39 participants (100%) reported the correct interpretation code 710 (results consistent with sickle cell carrier). One participant reported code 700 (No common Hb variant detected) which is incorrect. Some also suggested follow up referral and/or provided a free text comment.

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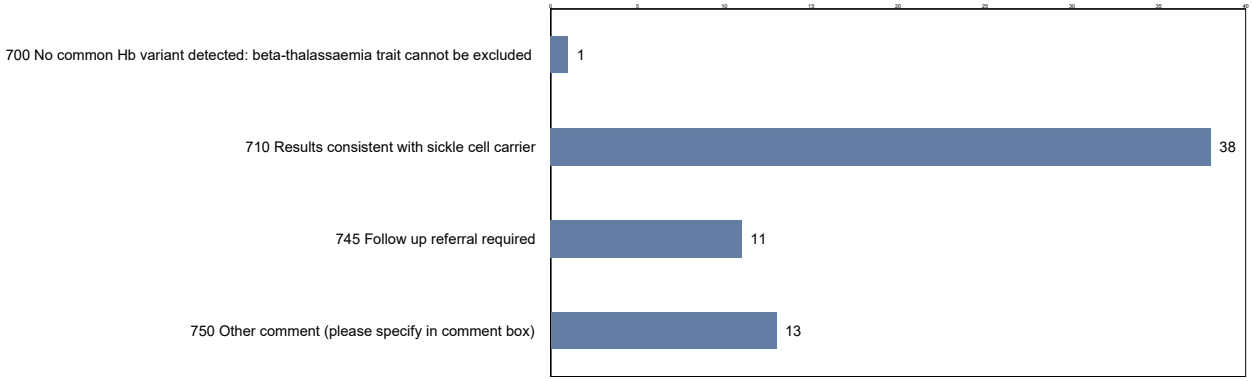
Sex	Male	RBC	(10^{12}/L)	4.99
Ethnic Origin	African	Hb	(g/L)	159
Age	24 hours	MCV	(fL)	112.4
	Mother is a sickle cell carrier	MCH	(pg)	31.9

Fraction Identification

Fraction	Expected	Essential	Your Results	Reported by all participants
Hb F	Expected	Essential	Present	39
Hb A	Expected	Essential	Present	39
Hb S	Expected	Essential	Present	39
Hb C			Absent	0
Hb D			Absent	0
Hb E			Absent	0
Hb C or E			Absent	0
Hb Non Specified			Absent	0

Analysis of Interpretation Codes



Data Analysis

Top five reported comments (see graph for all reported comments)

Code	Comment	Rank	Number
710	Results consistent with sickle cell carrier	1	38
750	Other comment (please specify in comm	2	13
745	Follow up referral required	3	11
700	No common Hb variant detected: beta-th	4	1

Reported Comments

Your reported comments with the number of participants that reported the same comment

Code	Comment	Rank	Number
710	Results consistent with sickle cell carrier	1	38

Comments:

2305LN2 simulated a specimen from a newborn, African, male infant. The baby's mother is a sickle carrier.
Haemoglobinopathy analysis indicated the presence of Hb F, Hb A and Hb S.
Specimens were distributed to 41 participants and 40 (97%) returned results.
39/40 (98%) reported the expected fractions (Hb F, Hb A and Hb S). The remaining 1 reported a blank result.
38/39 participants (100%) reported the correct interpretation code 710 (results consistent with sickle cell carrier). One participant reported code 700 (No common Hb variant detected) which is incorrect. Some also suggested follow up referral and/or provided a free text comment.

For information on data analysis and performance assessment see the UK NEQAS Haematology Participants' Manual (www.ukneqash.org)
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