

Haematology QAP Reports

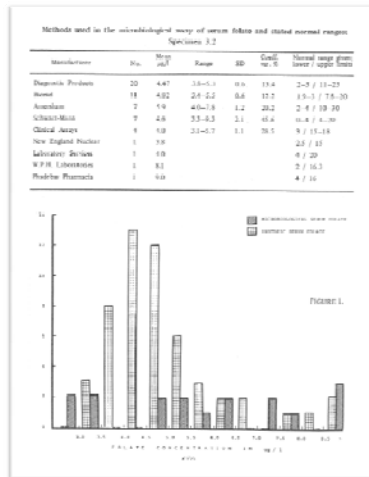
An Overview

Susan Neville –
Deputy Program Manager

History

- 1978 - a 32 page report presenting results from
 - morphology case studies
 - analysis of abnormal haemoglobins,
 - platelet counts
 - folate assays

1978



SPECIMENS 1.1. STABILIZED WHOLE BLOOD

This specimen was prepared using plasma rich plasma removed from fresh anticoagulated (EDTA) and centrifuged at 500 rpm for 20 minutes. Red blood cells were washed with isotonic saline and the supernatant was added to the plasma. The cells were then washed with isotonic saline containing chloroform and the supernatant was added to the plasma. The amount of plasma added was 1.75. The expected plasma result was 250 x 10⁹/l.

Results were received from 112 participants. Seven reported results of both automated and manual methods and these results were both included in the analysis. 9 stated the specimen was unsuitable for the laboratory and were excluded from analysis of the results. Table 6, 9.1.

Results by a variety of manual methods are shown in Table 6. These results confirm that manual counts are accurate and show that the test should be carried out. Despite the manual work being in the go with the 1975 survey there were 57 phlebotomists obtained data compared to 115 now. Only four for 1978 are 67 manual, 53 automated (6-man-hand).

In 1975 it was noted that the mean result of all manual methods was significantly lower ($P < 0.02$) than that of the automated methods. This was also found to be the case when manual methods were reported to have obtained from the Centre machines ($P < 0.001$). Same report Centre machine phlebotomist

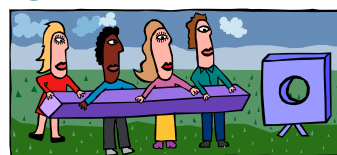
TABLE 6
Specimens 1.1. Stabilized Whole Blood
Manual Method of Platelet Counting

Method	Number of participants	Mean count x 10 ⁹ /l	Range x 10 ⁹ /l	%	Reference method
Automated method	17	232	140-285	47.5	71.7
Formal citrate	13	274	115-315	62.2	21.7
Coverse	6	(182, 230, 250, 230)	-	-	-
"Fluxus"	3	(240, 215, 180)	-	-	-
Method not stated	20	176	140-200	40.7	17.9
TOTAL	67	230 ^a	115-300	46.5	20.2

^aExpected result from the Centre machines. Same report Centre machine phlebotomist

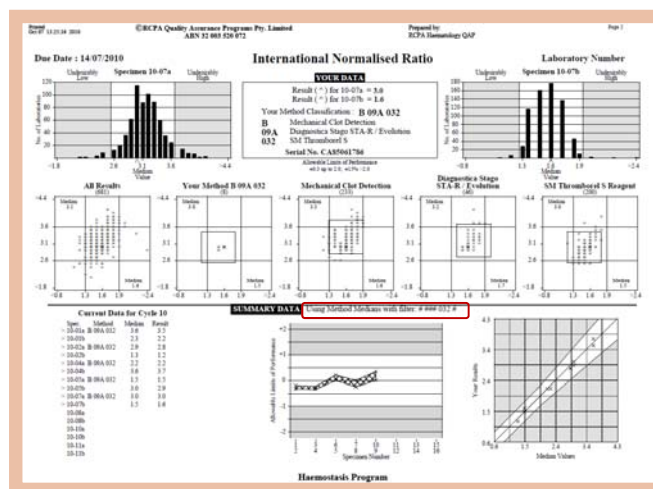
2003

- New Reporting system
 - Clinical Chemistry QAP developed software
 - Haematology QAP first to change over
 - Challenge of developing qualitative reports
 - Development ongoing with all Haematology QAP programs using QAP Software (Oncology Immunophenotyping in trial stage)

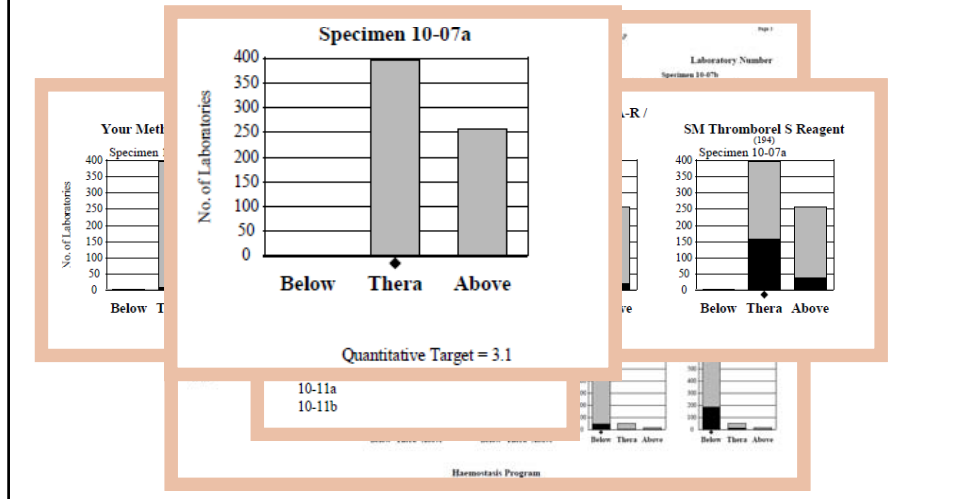


Haemostasis - Quantitative and Interpretation

INR - Quantitative



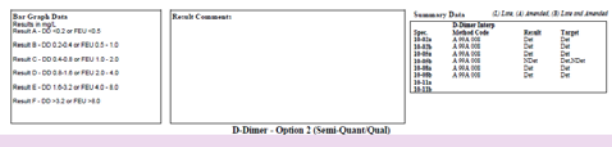
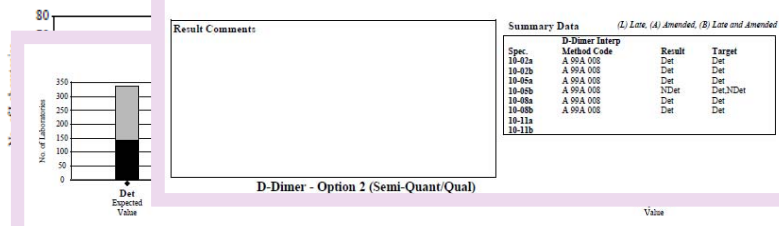
INR - Interpretation



Interpretation

- Haemostasis
 - INR, APTT, Fibrinogen, FVIII
- Additional Factors
 - FIX, FVII, FXI, FXII
- D-Dimer
 - Option 1 – Fully Quantitative
 - Option 2 – Semi Quantitative
 - Manual methods

D-Dimer - Semi Quantitative



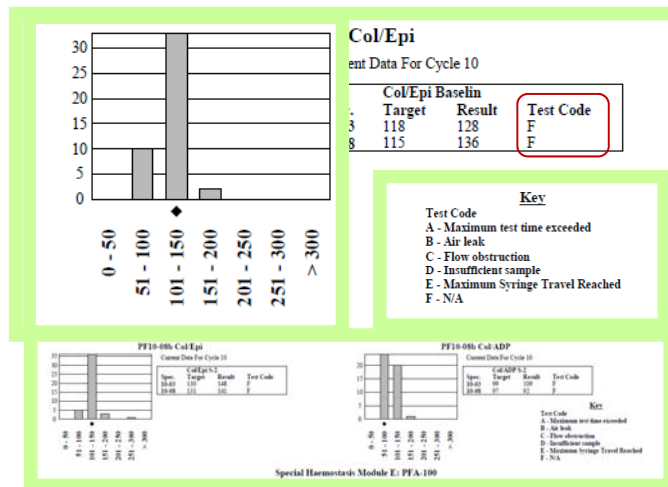
Special Haemostasis - Module E

PFA-100®

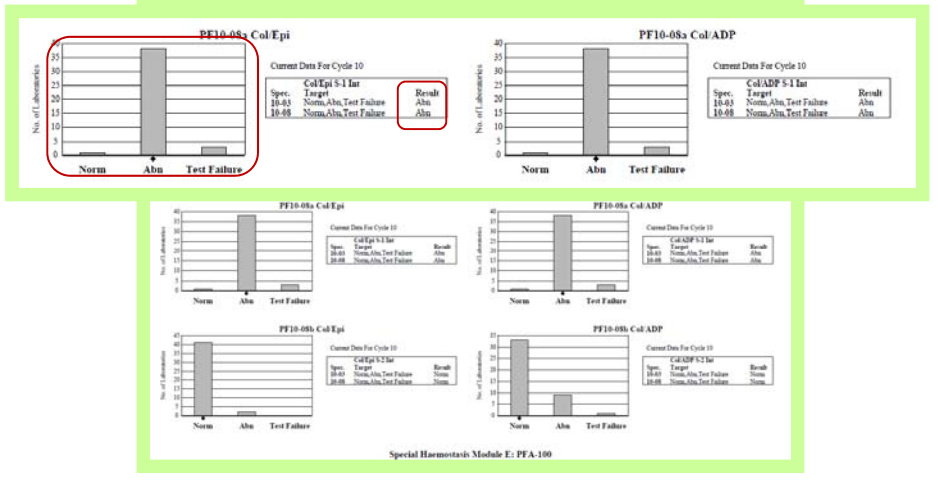
Module E PFA-100®

- Introduced 2010 as an educational program with no formal assessment – possible interpretive assessment in 2011
- A completely different style of Program and therefore report
- Participants are sent a tube containing an inhibitory substance and asked to collect a normal blood sample to add to these tubes
- Participants perform a baseline as well as Col/Epi and Col/ADP

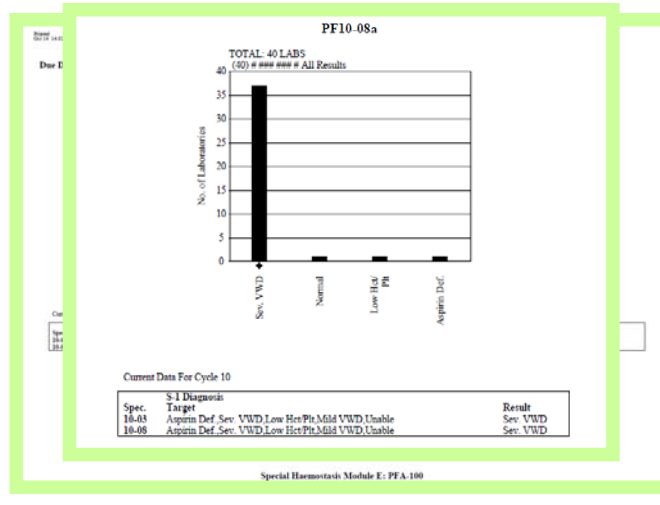
PFA-100®



PFA-100® - Interpretation



PFA-100® - Diagnosis



PFA-100® - Diagnosis

Page 14 of 24 (2018) © RCPA Quality Assurance Program Pty. Limited APO 12 688 528 973 Prepared by: RCPA Haematology GAP

SPECIAL HAEMOSTASIS MODULE E (PFA-100)

Welcome to the second PFA-100 (Module E) report. As explained previously, the format of this report is a little different to other Special Haemostasis reports, and an explanatory guide was provided separately with the first (Cycle 10, Run 1, March) dispatch. This Module was developed following several trial exercises in 2009 and 2009 (1, 3), and follows the same format as the first dispatch. As on that occasion, we were again generally pleased with the returned data for the current dispatch (Cycle 10, Run 2, August). In order to keep this inaugural year's exercise manageable for laboratories, we decided to send identical test challenges in this run (Cycle 10, Run 2, August) to those dispatched in the first dispatch (Cycle 10, Run 1, March).

PFA-100 Closure times:
As can be seen in the first set of figures on page 2 of this report, a 'normal' baseline PFA-100 closure time (CT) was obtained for both CoEpa and CoADP test cartridges by all participants, and this is a condition of progression to testing of subsequent challenges. Data is provided in bars of 50 seconds. As expected, most participants obtained a CT between 51-150 for CoEpa (with a median ('target') of 115sec, and most yielding a CT between 101-150sec. Similarly, all participants obtained a CT between 51-150 for CoADP (with a median ('target') of 65sec, and most yielding a CT between 51-100sec. The 'target' test code for the baseline results is 'N', which is simply the default setting, and means 'not applicable', as no PFA-100 test codes would be expected with baseline readings. These baseline findings were very similar to those obtained with the first dispatch (Cycle 10, Run 1, March), as well as within expectations (i.e. slightly longer CTs expected for CoEpa compared to CoADP cartridges).

As also seen in the first set of figures on page 2 of this report, the vast majority of participants obtained maximally prolonged CT results (>251sec) for test challenge PF10.03a for both CoEpa and CoADP (target = 301 or >300sec, with test code 'A' most likely). This challenge (identical to PF10.03a of Run 1, March) was designed to yield maximal CTs on both cartridges, and this was generally observed. Like last time, a few laboratories obtained CTs below 200sec; these laboratories should review their findings to assess if they also observed a test failure (or other test code error) on these occasions.

In contrast, for PF10.03b, the vast majority of participants obtained CT results similar to baseline (ie between 101-150sec for CoEpa and between 51-100sec for CoADP). Again, test code 'N' was most likely reported (as mentioned above, this is the default setting, and means 'not applicable', as no PFA-100 test codes would be expected with this challenge sample). This challenge (identical to PF10.03b of Run 1, March) did not contain any additive and was simply designed to yield normal CTs on both cartridges, and this was generally observed. Again, as in the first (March) dispatch there was a slight shift of CTs with this challenge; this would again indicate that simply manipulating blood by transferring this blood into another tube and then sampling might provide some minor prolongation of baseline CTs. There is more discussion of this observation later in this report.

PFA-100 Interpretations:
Interpretation is dealt with on the second set of figures on page 3 of the report. Given the slightly unusual nature of this module, the RCPA GAP has again decided not to provide any 'official' target interpretations for the second dispatch samples on the report itself, as this will result in the generation of 'For review' outcomes for some participants - perhaps similar on the inaugural year's official challenge. Accordingly, the second dispatch report should (like dispatch 1, March) be viewed as a self-assessment exercise for all participants. The baseline CTs were reported as 'Normal' by all but two participants for both CoEpa and CoADP, and a normal result would be expected (and the obvious 'target'), considering that a normal baseline CT is a condition of progression to testing of subsequent challenges. The two participants reporting 'abnormal' baselines reported CT values that were only mildly prolonged, and this did not result in any obvious adverse effect on test challenge data.

For challenge PF10.03a, designed to yield maximal CTs on both cartridges, the vast majority of participants identified an 'Abnormal' CT, and this was as expected (and would have been the 'official target' set by the RCPA GAP). Only a single participant observed a 'Normal' CT with the CoEpa cartridge and the CoADP cartridge. This participant is asked to review their test data and confirm this finding (i.e. did they actually obtain normal CTs or instead a test failure, such as >101C, for example). A few participants obtained a 'Test Failure' for the CoEpa cartridge and/or the CoADP cartridge. These participants are asked to review their test procedure to ensure they are not excessively manipulating the whole blood in this exercise (i.e. mixing not too vigorous, air bubbles avoided). Also, spare challenge tubes are provided for

Special Haemostasis Module E: PFA-100

Morphology - Interim and proposed End-of-Cycle

Morphology 2003 - 2007

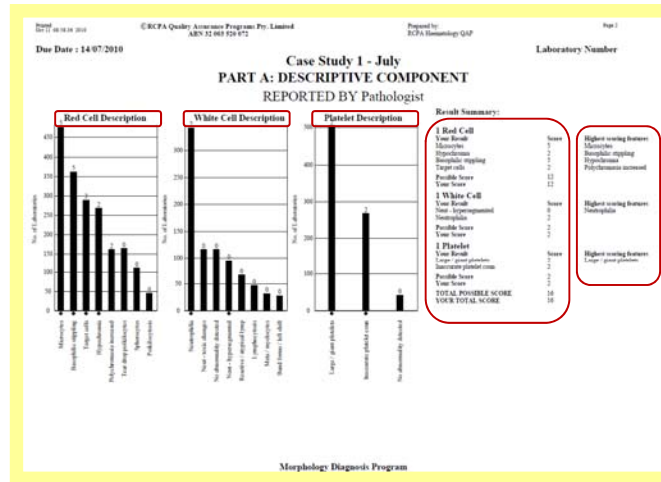
Printed: 11:14:34 2007 ©RCFA Quality Assurance Program Pty. Limited Prepared by: RCFA Haematology QAP
 ABN 52 083 520 972
 Due Date : 18/07/2007 Laboratory Number

Spec.	Target	Result	Grade
7.02a	Plasmodium falciparum	Plasmodium falciparum	ACCEPTABLE
7.02b	AMEL - M0	AMEL - M1	ACCEPTABLE
7.02c	Chromid filigulae	Chromid filigulae	ACCEPTABLE
7.05a	ITP = Splenectomy	Autoimmune dis. + Splene	ACCEPTABLE
7.05b	CML + Lymphocyte Disord	CML Chronic Phase	ACCEPTABLE
7.05c	Plasmodium malariae	Plasmodium malariae	ACCEPTABLE
7.07a	Myelodyspos	MDS/MPD + Splen	ACCEPTABLE
7.07b	AMEL - M2	AMEL - M5	ACCEPTABLE
7.07c	Chronic Neutrophilic Leu	Atypical chronic myeloid	ACCEPTABLE
7.10a			
7.10b			
7.10c			

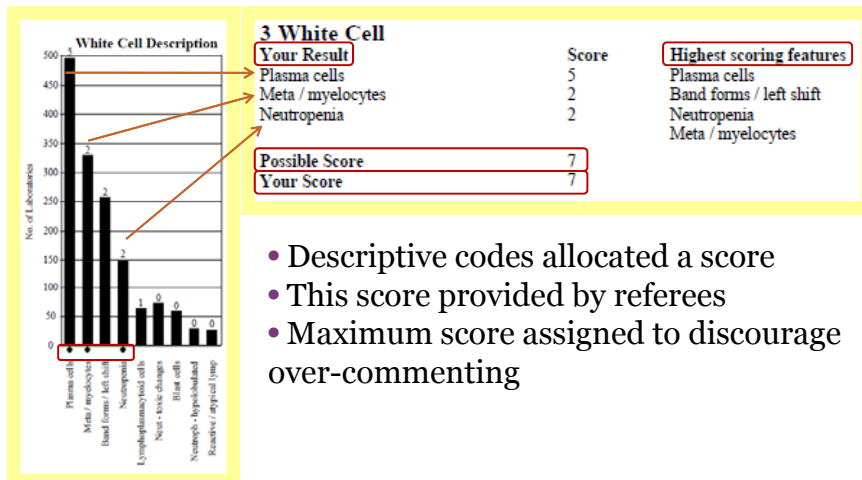
Morphology 2008

- After consultation with participants and Morphology Advisory committee introduced a new scoring system
- Descriptive and Diagnosis codes
- Codes allocated a score for each case
- Maximum score “cap” applied to discourage over-commenting
- System used in Malarial Parasite program

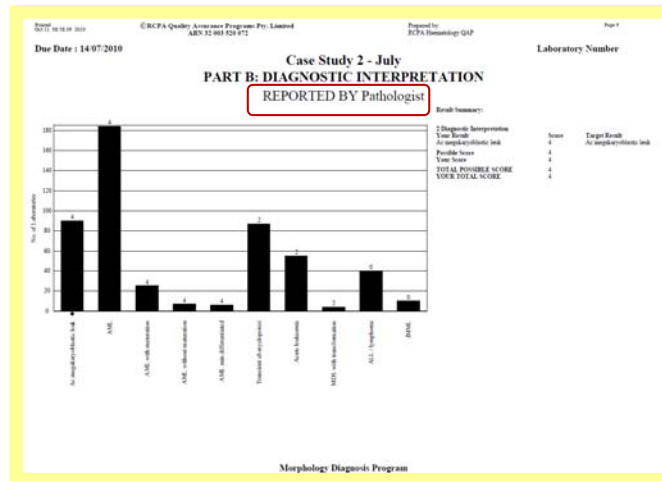
Morphology - Descriptive



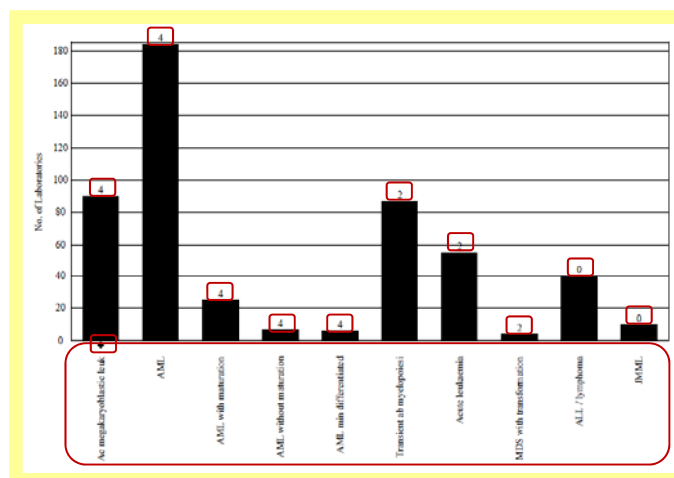
Morphology - Descriptive



Morphology - Diagnosis



Morphology - Diagnosis



Morphology - Diagnosis

Result Summary:

2 Diagnostic Interpretation

Your Result	Score
Ac megakaryoblastic leuk	4
Possible Score	4
Your Score	4
TOTAL POSSIBLE SCORE	4
YOUR TOTAL SCORE	4

Target Result
Ac megakaryoblastic leuk

Morphology - Diagnosis

© BCQA Quality Assurance Program For: Limited
ABO 21-953 (24-07)

Prepared by:
BCQA (Immuno)GAP

Page 10

Due Date : 14/07/2019

Case Study 2 - July

Laboratory Number

PART B: DIAGNOSTIC INTERPRETATION

Code	Lab	2 Day Issue Interpretation Code	Score
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9
10	10	10	10
11	11	11	11
12	12	12	12
13	13	13	13
14	14	14	14
15	15	15	15
16	16	16	16
17	17	17	17
18	18	18	18
19	19	19	19
20	20	20	20
21	21	21	21
22	22	22	22
23	23	23	23
24	24	24	24
25	25	25	25
26	26	26	26
27	27	27	27
28	28	28	28
29	29	29	29
30	30	30	30
31	31	31	31
32	32	32	32
33	33	33	33
34	34	34	34
35	35	35	35
36	36	36	36
37	37	37	37
38	38	38	38
39	39	39	39
40	40	40	40
41	41	41	41
42	42	42	42
43	43	43	43
44	44	44	44
45	45	45	45
46	46	46	46
47	47	47	47
48	48	48	48
49	49	49	49
50	50	50	50
51	51	51	51
52	52	52	52
53	53	53	53
54	54	54	54
55	55	55	55
56	56	56	56
57	57	57	57
58	58	58	58
59	59	59	59
60	60	60	60
61	61	61	61
62	62	62	62
63	63	63	63
64	64	64	64
65	65	65	65
66	66	66	66
67	67	67	67
68	68	68	68
69	69	69	69
70	70	70	70
71	71	71	71
72	72	72	72
73	73	73	73
74	74	74	74
75	75	75	75
76	76	76	76
77	77	77	77
78	78	78	78
79	79	79	79
80	80	80	80
81	81	81	81
82	82	82	82
83	83	83	83
84	84	84	84
85	85	85	85
86	86	86	86
87	87	87	87
88	88	88	88
89	89	89	89
90	90	90	90
91	91	91	91
92	92	92	92
93	93	93	93
94	94	94	94
95	95	95	95
96	96	96	96
97	97	97	97
98	98	98	98
99	99	99	99
100	100	100	100

Morphology Diagnosis Program

Morphology - Diagnosis

© 2017 04/18/2018 BCRA Quality Assurance Program For Limited ABN 21 001 126 872 Page 11
 Due Date : 14/07/2018
 Laboratory Number

Case Study 2 - July COMMENTARY

Result Comment:
CASE STUDY 2: M010-07b
3 yo male - Petechial rash, Down syndrome

WCC	9.6 x 10 ⁹ /L
RCC	unavailable
Hb	106 g/L
MCV	110 fL
MCH	unavailable
MCNC	unavailable
PLT	57 x 10 ⁹ /L

This major abnormality on this blood film from a child with Down syndrome is the presence of myeloblasts. These blasts are medium in size with a moderate to high nuclear cytoplasmic ratio and slightly granular chromatin. The nuclei vary from regular to very lobulated, and have 0-2 nucleoli. The more lobulated nuclei are of interest in that they show some resemblance to the nuclei in megakaryocytes. The cytoplasm varies from pale to quite deeply basophilic and some show indistinct slightly eosinophilic granulation. Only very occasional cells show cytoplasmic blebbing.

There is an increased incidence of acute leukaemia in Down syndrome particularly acute megakaryoblastic leukaemia. The blasts in this case did in fact express the typical antigens CD61 and CD41 but this diagnosis is difficult to make morphologically.

The 2008 WHO classification has a new category *Myeloid leukaemia associated with Down syndrome* which includes acute megakaryoblastic leukaemia and other acute myeloid leukaemias in Down syndrome patients. The blasts in this condition are described as having round to slightly irregular nuclei, cytoplasmic blebs and basophilic cytoplasm with coarse basophilic (but myeloperoxidase negative) granules sometimes seen. Our code list does not include this condition and the referees were divided about scoring for a number of subtypes of acute myeloid leukaemia so all these received a score of 4.

Transient abnormal myelopoiesis is a disorder of Down syndrome *neoblasts*, so did not receive the full score although it may have similar morphological findings to AML. The referees were also divided in their assessment of the red cell morphology, ie as to whether macrocytes should be reported so this was considered optional.

Morphology Diagnosis Program

Morphology - Summary

Case Study 1 Part A

Lab Part A Score = 16
 Total Possible Score = 16
 Your score as % of possible score = 100

Lab Scores as % of possible score

Part B

Laboratory Score

Case Study 2 Part A

Lab Part A Score = 9
 Total Possible Score = 11
 Your score as % of possible score = 82

Lab Scores as % of possible score

Part B

Laboratory Score

Case Study 3 Part A

Lab Part A Score = 16
 Total Possible Score = 16
 Your score as % of possible score = 100

Lab Scores as % of possible score

Part B

Laboratory Score

Morphology Diagnosis Program

Morphology - End-of-Cycle

February Dispatch				PART A - DESCRIPTION		PART B - DIAGNOSIS	
CASE STUDY	LAB SCORE	POSSIBLE SCORE	SCORE AS %	LAB SCORE	POSSIBLE SCORE	LAB SCORE	POSSIBLE SCORE
Case Study 1	Part A - Score	Part A - Possible Score	Part A - Score as %	Part B - Score	Part B - Possible Score	Part B - Score	Part B - Possible Score
Case Study 2	Part A - Score	Part A - Possible Score	Part A - Score as %	Part B - Score	Part B - Possible Score	Part B - Score	Part B - Possible Score
Case Study 3	Part A - Score	Part A - Possible Score	Part A - Score as %	Part B - Score	Part B - Possible Score	Part B - Score	Part B - Possible Score
SUB TOTAL	Part A - Score	Part A - Possible Score	Part A - Score as %	Part B - Score	Part B - Possible Score	Part B - Score	Part B - Possible Score

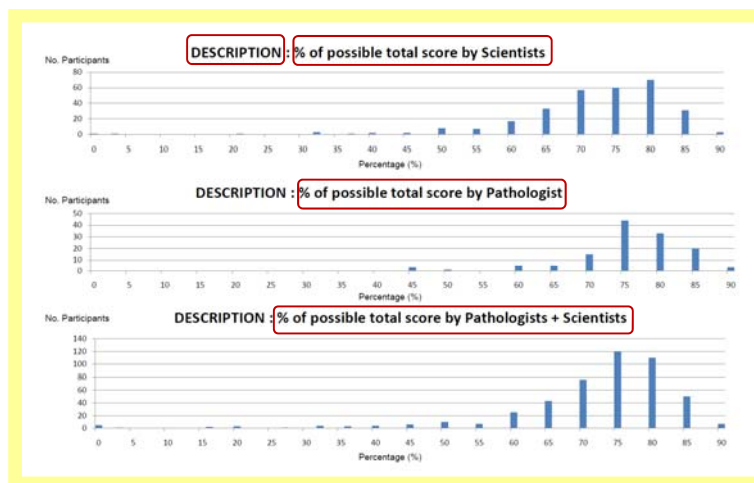
May Dispatch				PART A - DESCRIPTION		PART B - DIAGNOSIS	
CASE STUDY	LAB SCORE	POSSIBLE SCORE	SCORE AS %	LAB SCORE	POSSIBLE SCORE	LAB SCORE	POSSIBLE SCORE
Case Study 1	Part A - Score	Part A - Possible Score	Part A - Score as %	Part B - Score	Part B - Possible Score	Part B - Score	Part B - Possible Score
Case Study 2	Part A - Score	Part A - Possible Score	Part A - Score as %	Part B - Score	Part B - Possible Score	Part B - Score	Part B - Possible Score
Case Study 3	Part A - Score	Part A - Possible Score	Part A - Score as %	Part B - Score	Part B - Possible Score	Part B - Score	Part B - Possible Score
SUB TOTAL	Part A - Score	Part A - Possible Score	Part A - Score as %	Part B - Score	Part B - Possible Score	Part B - Score	Part B - Possible Score

July Dispatch				PART A - DESCRIPTION		PART B - DIAGNOSIS	
CASE STUDY	LAB SCORE	POSSIBLE SCORE	SCORE AS %	LAB SCORE	POSSIBLE SCORE	LAB SCORE	POSSIBLE SCORE
Case Study 1	Part A - Score	Part A - Possible Score	Part A - Score as %	Part B - Score	Part B - Possible Score	Part B - Score	Part B - Possible Score
Case Study 2	Part A - Score	Part A - Possible Score	Part A - Score as %	Part B - Score	Part B - Possible Score	Part B - Score	Part B - Possible Score
Case Study 3	Part A - Score	Part A - Possible Score	Part A - Score as %	Part B - Score	Part B - Possible Score	Part B - Score	Part B - Possible Score
SUB TOTAL	Part A - Score	Part A - Possible Score	Part A - Score as %	Part B - Score	Part B - Possible Score	Part B - Score	Part B - Possible Score

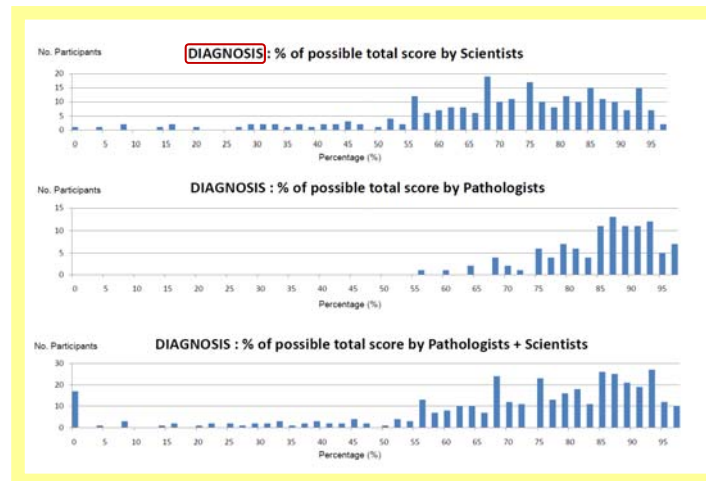
October Dispatch				PART A - DESCRIPTION		PART B - DIAGNOSIS	
CASE STUDY	LAB SCORE	POSSIBLE SCORE	SCORE AS %	LAB SCORE	POSSIBLE SCORE	LAB SCORE	POSSIBLE SCORE
Case Study 1	Part A - Score	Part A - Possible Score	Part A - Score as %	Part B - Score	Part B - Possible Score	Part B - Score	Part B - Possible Score
Case Study 2	Part A - Score	Part A - Possible Score	Part A - Score as %	Part B - Score	Part B - Possible Score	Part B - Score	Part B - Possible Score
Case Study 3	Part A - Score	Part A - Possible Score	Part A - Score as %	Part B - Score	Part B - Possible Score	Part B - Score	Part B - Possible Score
SUB TOTAL	Part A - Score	Part A - Possible Score	Part A - Score as %	Part B - Score	Part B - Possible Score	Part B - Score	Part B - Possible Score

TOTAL			Part A - Score	Part A - Possible Score	Part A - Score as %	Part B - Score	Part B - Possible Score	Part B - % of Possible Score

Morphology - End-of-Cycle



Morphology - End-of-Cycle

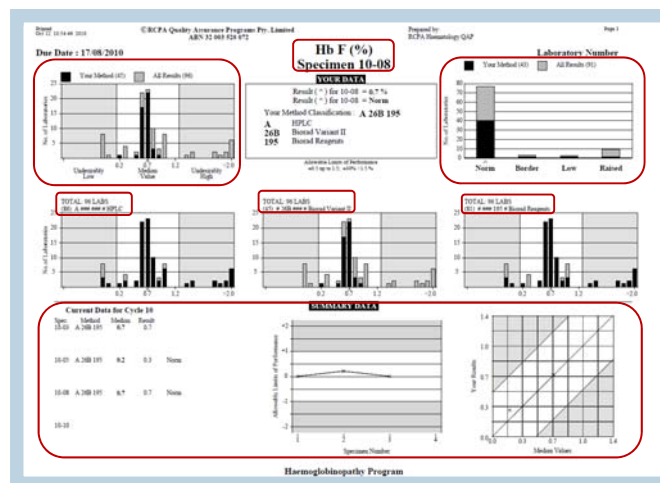


Haemoglobinopathy - Single sample

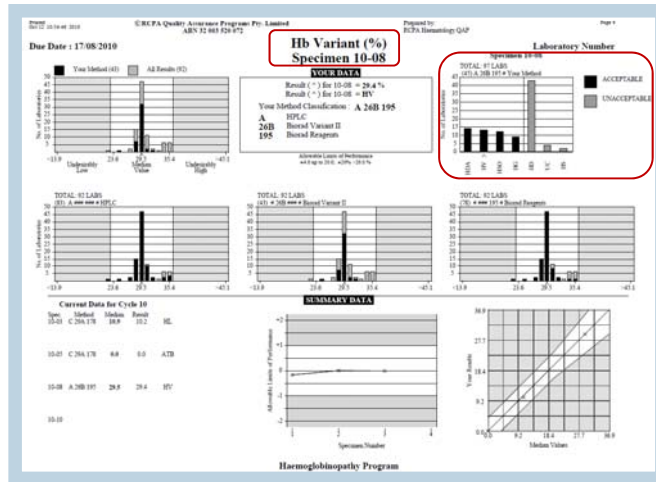
Haemoglobinopathy

- This program is based on single sample testing
- Report represents results for HbA2, HbF and Variant
- Median, SD and CV provided for a laboratory's method and all methods
- Result commentary prepared by expert advisory committee – significant educational component

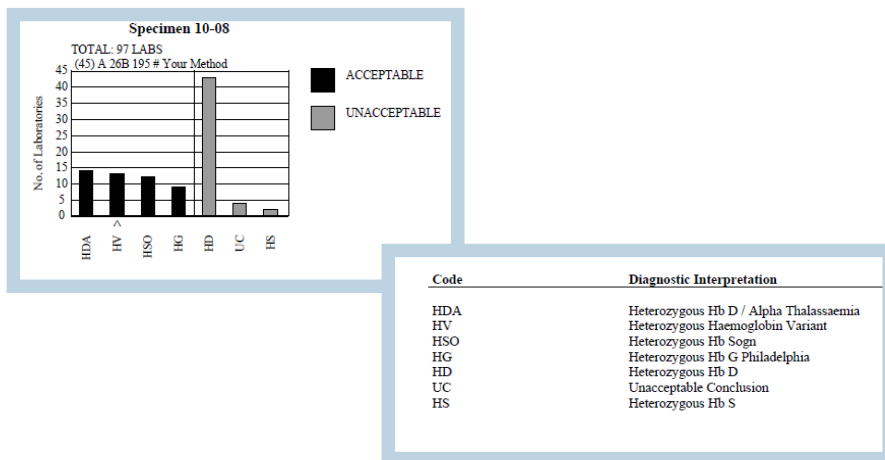
Haemoglobinopathy



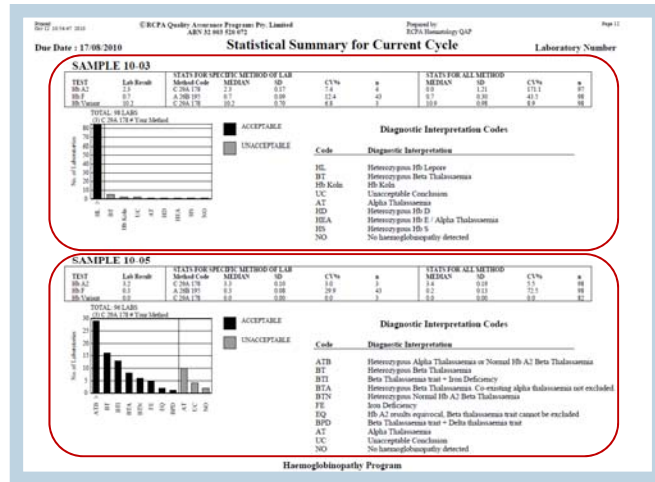
Haemoglobinopathy



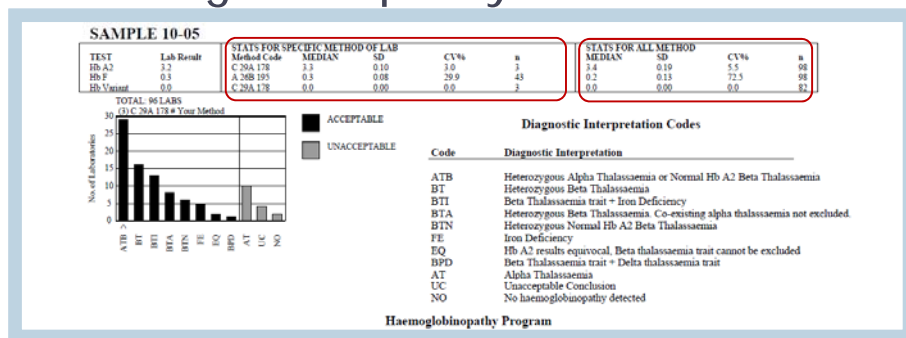
Haemoglobinopathy



Haemoglobinopathy



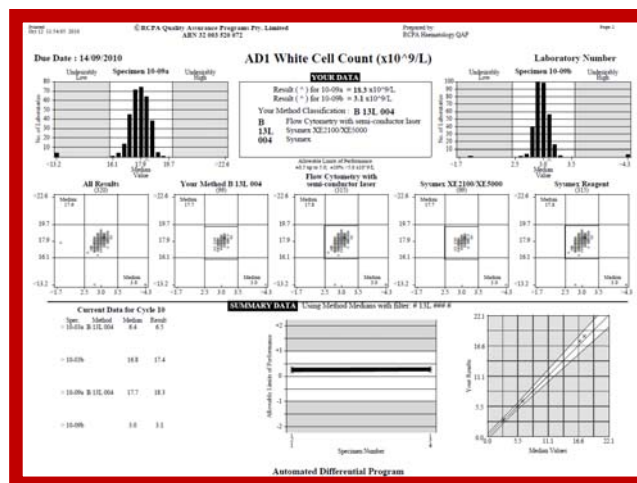
Haemoglobinopathy



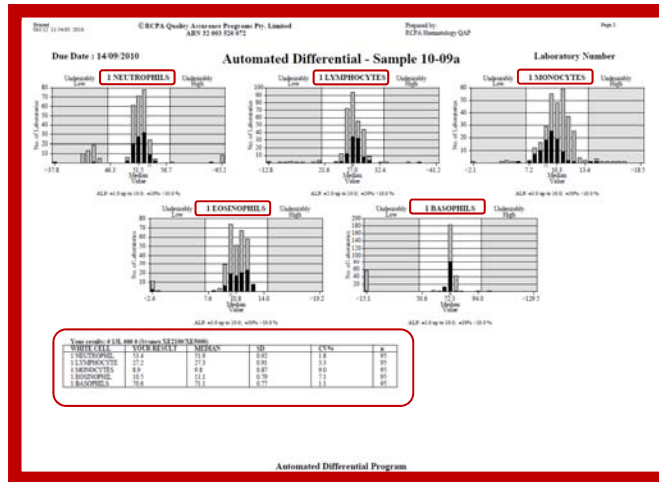
Automated Differential

Additional statistics within module

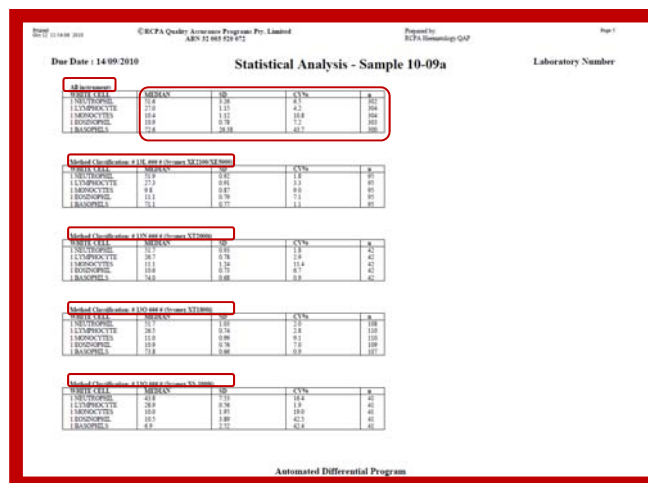
Automated Differential



Automated Differential

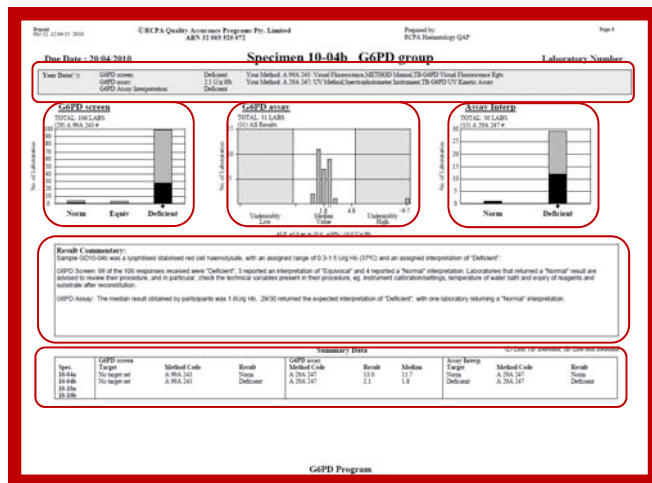


Automated Differential



G-6-PD Screen and Assay Report

G-6-PD



Areas of Development

Developments

- Continued development and upgrading of web based reports
- Availability of .pdf reports – important the contact / email information held is correct
- Security of the delivery methods for “soft” copies of reports a major consideration

Haemoglobinopathy - On-line



Conclusion

- Improvement of reports ongoing
- RCQA Quality Assurance Programs has employed IT and Software developers to ensure the provision of meaningful and informative reports for all Programs
- Where possible, standardisation of reports across the different disciplines

Conclusion

- Stress the importance of keeping the Haematology QAP informed of any method changes
- Importance of up to date contact information
- Value participant feedback on ways the “hard” and “soft” reporting systems can be improved

Thank you

- Haematology QAP
 - (61 2) 9933 0100
 - haematology@rcpaqap.com.au