

# **The international consensus group for hematology review: suggested criteria for action following automated CBC and WBC differential analysis.**

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## **Abstract**

In the half century since the first use of automated analyzers, manual techniques, especially microscopic examination of a stained blood film, have complemented analyzer results to provide a comprehensive hematology report on a patient's blood sample. Over the years, as the capabilities and performance of automated analyzers have improved, the respective roles of the automated analyzer and the complementary procedures have changed. Manual action (most commonly smear review) following automated analyzer results is usually triggered by determining whether the results trigger one of a series of criteria for review of results. There is little uniformity among different laboratories on criteria for action. Recognizing the long-standing need for generally accepted guidelines ("rules") which could be applied to criteria for review of CBC and differential results from automated hematology analyzers, Dr. Berend Houwen invited 20 experts to a meeting in the Spring of 2002 to discuss the issues and determine the most appropriate criteria. At this meeting, 83 rules were developed by consensus agreement. These rules were then tested in 15 laboratories on a total of 13,298 blood samples. After a detailed analysis of the data, the rules were refined and consolidated to produce 41 rules that are presented here. They include rules for first-time samples as well as delta rules for repeat samples within 72 hours from a patient. It is hoped that these rules will be useful to a large number of hematology laboratories worldwide. To facilitate validating these rules in individual laboratories before implementation in routine operation for patient samples, a suggested protocol is attached to this paper.

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## Consensus Guidelines: Rules

Rule #	Parameter	Primary	and/or	Secondary	and/or	Tertiary	and/or	fourth	Action 1	Action 2	Action 3
1	Neonate	First sample							Slide Review		
2	WBC, RBC, HGB, PLT, Retics	Exceeds linearity							Dilute sample and rerun		
3	WBC, PLT	Lower than Lab verified instrument linearity							Follow lab SOP		
4	WBC, RBC, HGB, PLT	Vote Out							Check sample for clot	Rerun sample	If persists, perform alternate counting method
5	WBC	<4.0 OR >30.0	and	first time					Slide Review		
6	WBC	<4.0 OR >30.0	and	delta failed	and	within 3 days			Slide Review		
7	PLT	<100 OR >1000	and	first time					Slide Review		
8	PLT	Any value	and	Delta Check Fail					Slide Review		
9	HGB	<7g/dl or >2g/dl above upper reference range for age and sex	and	first time					Slide Review	Verify sample integrity if indicated	
10	MCV	<75fl or >105fl (Adult)	and	first time	and	specimen is <24 hours old			Slide Review		
11	MCV	>105 fl	and	adult	and	specimen is >24 hrs old			Slide Review for macrocytic associated changes	Request fresh sample if NO macrocytic associated changes seen	Report with comment if fresh sample is not available
12	MCV	Any value	and	delta fails	and	specimen is <24 hours old			Verify sample integrity/identity		
13	MCHC	>=2 units above upper limit of reference range							Check for lipemia, hemolysis, RBC agglutination, spherocytes.		
14	MCHC	<30	and	normal/high MCV					Investigate possible IV contamination or other sample specific cause.		
15	RDW	>22	and	first time					Slide Review		



38	Blast flag	Flag +	and	previous confirmed result	and	delta pass or negative delta for WBC	and	within 3-7 days	Follow lab SOP		
39	Blast flag	Flag +	and	previous confirmed result	and	positive delta fail for WBC			Slide Review		
40	NRBC flag	Flag +							Slide Review	If positive, enumerate NRBC count, correct WBC if appropriate	
41	Retics	Abnormal pattern							Look at instrument output	Repeat if aspiration problem	If persists, review slide