

CBC REVIEW CRITERIA - LH ANALYZERS

- St. Joseph Medical Center Tacoma, WA
 St. Clare Hospital Lakewood, WA
 St. Elizabeth Hospital Enumclaw, WA
 St. Francis Hospital Federal Way, WA
 St. Anthony Hospital Gig Harbor, WA
 PSC

POLICY

The FHS Laboratory has defined parameters for reviewing results from the LH Series Hematology analyzers.

REPORTABLE RANGE FOR HEMATOLOGY ANALYZERS

FHS CRITICAL VALUES FOR ADULTS

Parameter	Beckman LH750	Beckman LH500
WBC	0.4-385.0	0.4-190.0
RBC	0.6-7.6	0.6-6.50
HGB	1.7-22.0	1.7-21.7
MCV	50-150	50-150
PLT	5-2500	5-2000
RET	0.2-25	0.2-25

Parameter	Critical Low	Critical High
WBC	< 2.0	>50.0
HCT	<22.0	>60
PLT	< 30	>1000

FHS CRITICAL VALUES FOR PEDIATRICS

CITY MD CRITICALS

Parameter	Age	Critical Low	Critical High
HGB	<2 wks	<7.0	>21.6
HGB	2 wk-1 mo	<7.0	>20.0
HCT	<2 wks	<24	>66
HCT	2 wk-1 mo	<24	>60
HCT	>1 mo – 12 yr	<24	>71

Parameter	Critical Low	Critical High
WBC		>17.0
HGB	<7.5	
PLT	<20	
ANC	<0.5	
BAND%		>7

SLIDE REVIEW CRITERIA

NOTE:

- ◆ Refer to Hematology Slide Review procedure (R-W-HEM1326) when performing all slide reviews. Perform and document WBC estimate, platelet estimate, and morphology for WBCs, RBCs and Platelets on all slide reviews.
- ◆ Commonly used Comments that may accompany results are listed within and at the end of this Policy.
- ◆ Refer to Failed Patient Run (R-PO-CH0808) for clinically acceptable repeat/correlation limits.

Parameter	First Action	Second Action	Final Action	Related Document(s)
WBC COUNT				
WBC : (+++++), or WBC: >385.0 LH750 WBC: >190.0 LH500	Dilute and repeat.	<ul style="list-style-type: none"> ◆ Follow procedure for Elevated WBC's. ◆ Correct RBC and/or indices, if indicated. ◆ NOTE: elevated WBC may cause R flag on HGB. See HGB R flag in this document 	<ul style="list-style-type: none"> ◆ Slide review. ◆ WBC estimate. ◆ Man Diff, if Indicated. ◆ If diluted results are reported, add non-chartable comment-DILUTED "Results obtained by sample dilution" 	DXH LH Elevated WBC M-W-HEM-1318
WBC with "R" flags	Check for clots If WBC >90 dilute and repeat.	Check for NRBC or plt clumps	<ul style="list-style-type: none"> ◆ Slide review. ◆ WBC estimate. ◆ Man Diff, if indicated. 	WBC Slide Estimates R-W-HEM-1420
WBC: <2.5 or >30.0	Scan slide at 1 st presentation	AND, every 3 days	Slide review.	
WBC: <1.0	Scan slide: Follow Procedure: Low WBC Counts.	<ul style="list-style-type: none"> ◆ Scan for immature or abnormal cells. If sufficient cells, Auto or Man diff reported. ◆ If insufficient cells, cancel and credit Diff (if necessary). ◆ Submit for Path Review if indicated. 	<ul style="list-style-type: none"> ◆ Chartable comments if no abnormal or immature cells were seen- BKRTFC "Too few cells to perform differential." BKRIMNO "No immature or abnormal cells seen." ◆ Chartable comments if immature or abnormal cells were seen- BKRTFC "Too few cells to perform differential." BKRIMPR "Abnormal or Immature cells present." PATHREV "Slide submitted for pathologist review." 	WBC Low Count R-W-HEM-1325

Parameter	First Action	Second Action	Final Action	Related Document(s)
RBC / HH / Indices				
RBC: > 7.6			<ul style="list-style-type: none"> ◆ Dilute and repeat. ◆ If diluted results are reported, add non-chartable comment-DILUTED "Results obtained by sample dilution" 	
HGB: <1.7	Below linearity- unable to report		Report as HGB <1.7	
HGB: >22.0			<ul style="list-style-type: none"> ◆ Dilute and repeat. ◆ If diluted results are reported, add non-chartable comment- DILUTED "Results obtained by sample dilution" 	
HGB R flag	Check sample for lipemia or elevated WBC	<ul style="list-style-type: none"> ◆ If WBCs are elevated, make a dilution to remove the turbidity and R flagging caused by WBCs which interferes with Hgb readings. Use the lowest dilution possible. ◆ For lipemic or abnormal protein samples, perform a Plasma Replacement. 	<ul style="list-style-type: none"> ◆ If diluted results are reported, add non-chartable comment- DILUTED "Results obtained by sample dilution" ◆ If Plasma replacement results are reported, add non-chartable comment- PLASMAREP "Results obtained after plasma replacement was performed." 	Plasma Replacement R-W-HEM1319
HCT: Any value.	Failed delta.	<ul style="list-style-type: none"> ◆ For Failed delta, investigate possibility of mislabeled sample 	Review patient or TX history	
MCV: <65 OR >115	1 st presentation, Slide review	AND, every 30 days		
MCV: Failed Delta	Possible mislabel	<ul style="list-style-type: none"> ◆ Possible abnormal chemistries, see CBC Interference from Abnormal Chemistries M-W-HEM1576 	<ul style="list-style-type: none"> ◆ For Failed delta, investigate possibility of mislabeled sample 	CBC Interference from Abnormal Chemistries M-W-HEM-1576

MCHC: >37.0	Suspect: <ul style="list-style-type: none"> ◆ Cold Agg, ◆ Lipemia, ◆ Hemolysis, ◆ Spherocytes. ◆ Instrument error ◆ Short sampling in open mode 	See Procedure for <ul style="list-style-type: none"> ◆ RBC Agglutinins or ◆ Plasma Replacement 	<ul style="list-style-type: none"> ◆ Prewarm, plasma replace, or dilute specimen, as indicated. If warmed results are reported, add chartable comment- BKRWARM "Sample warmed at 37 degrees. Possible cold agglutinin." ◆ If Plasma replacement results are reported, add non-chartable comment- PLASMAREP "Results obtained by plasma replacement." ◆ If diluted results are reported, add non-chartable comment- DILUTED "Results obtained by sample dilution" 	<ul style="list-style-type: none"> ◆ RBC Agglutination Management R-W-HEM-1413 ◆ Plasma Replacement R-W-HEM-1319 ◆ CBC Interference from Hemolysis R-W-HEM-1582
MCHC: <30.0	AND, Normal or High MCV	Check for <ul style="list-style-type: none"> ◆ instrument error or ◆ short sampling in open mode 	Check for sample related causes, <ul style="list-style-type: none"> ◆ contamination ◆ hypochromia 	CBC Interference from Abnormal Chemistries M-W-HEM-1576
RDW: >24.0	1 st presentation	Check for history of recent transfusion	Slide review.	
Parameter	First Action	Second Action	Final Action	Related Document(s)
PLT COUNT				
PLT: (+++++) PLT >2500	Dilute and repeat	Slide review for 1 st presentation.	<ul style="list-style-type: none"> ◆ Perform Slide estimate. ◆ If diluted results are reported, add non-chartable comment- DILUTED "Results obtained by sample dilution" ◆ Pathologist review, if indicated. 	<ul style="list-style-type: none"> ◆ Platelet Count Estimate R-W-HEM-1421, ◆ Platelet Estimates Range Microscope R-F-HEM-0300
PLT: <80	Check for clot	Slide review for 1 st presentation.	Slide review and estimate	<ul style="list-style-type: none"> ◆ Platelet Count Estimate R-W-HEM-1421, ◆ Platelet Estimates Range Microscope R-F-HEM-0300
PLT: <5	Check for clot	Slide review for 1 st presentation.	<ul style="list-style-type: none"> ◆ Slide review and estimate- ◆ If they match instrument, report as <5 	
PLT: Any value	Failed delta.	Check for clots.	Slide review and estimate.	

Parameter	First Action	Second Action	Final Action	Related Document(s)
Differential				
Absolute Neut: <1.0 or >20.0	Scan slide-1 st presentation	AND, every 3 days.	Follow Slide Review Procedure	Hematology Slide Review Procedure R-W-HEM-1326
Absolute Lymph: >5.0 adult >7.0 (<12 y.o.)	Scan slide-1 st presentation	AND, every 3 days	Follow Slide Review Procedure	
Absolute Mono: >1.5 adult >3.0 (<12 y.o.)	Scan slide-1 st presentation	AND, every 3 days.	Follow Slide Review Procedure	
Absolute Eos: >2.0	Scan slide-1 st presentation	AND, every 3 days.	Follow Slide Review Procedure	
Baso: Absolute >0.5 or Percent>6.0%	Scan slide-1 st presentation	Follow Slide Review Procedure	Suspect instrument error if baso's not present on slide.	
Diff Vote-out or "R"	Check for clots.	Repeat, if indicated.	MAN DIFF if unresolved.	
Flags / Codes				
Vote-Outs (.....)	Check for clots.	Repeat, if indicated.	If diff vote-out & unresolved: perform MAN DIFF	
"R" Flags	Check sample and repeat.	If persists, scan slide.	WBC/PLT estimate may be indicated.	<ul style="list-style-type: none"> ◆WBC Slide Estimates R-W-HEM-1420 ◆Platelet Count Estimate R-W-HEM-1421, ◆Platelet Estimates Range Microscope R-F-HEM-0300
IMM NE2	Slide Review for 1 st presentation	AND, every 3 days if WBC consistent with previous.	Repeat slide review if WBC or differential results have significant changes.	Failed Patient Run R-PO-CH0808

Blast: MO, NE, LY	Repeat, if indicated.	Slide review.	<ul style="list-style-type: none"> ◆MAN DIFF if blasts seen in slide review. ◆CBC Path Review if indicated. 	
Variant Lymph	1 ST presentation.	AND, every 3 days.	<ul style="list-style-type: none"> ◆Slide Review. ◆CBC Path Review if indicated. 	
Cellular Interference	Check sample. Repeat, if indicated.	<ul style="list-style-type: none"> ◆See procedure for Cellular Interference ◆Do WBC/PLT estimate 	<ul style="list-style-type: none"> ◆Slide Review. ◆If WBC count is manually corrected for NRBCs, add chartable comment WBCCOR "WBC Count manually corrected for NRBCs." 	<ul style="list-style-type: none"> ◆LH Cellular Interference M-W-HEM-1320 ◆WBC Slide Estimates R-W-HEM-1420 ◆Platelet Count Estimate R-W-HEM-1421, ◆Platelet Estimates Range Microscope R-F-HEM-0300 ◆Hematology Calculations R-W-HEM1436
Platelet Clumps	Check sample. Vortex and repeat.	Slide review.	<ul style="list-style-type: none"> ◆See procedure for Platelet Clumping. ◆If unable to resolve platelet clumping or obtain a new specimen, report chartable comment BKRCLUMP "Unable to report platelet count due to platelet clumping." ◆Delete MPV result. ◆Add comment about platelet adequacy based on platelet estimate. BKRPLTEST, then F2 to choose appropriate response. 	<ul style="list-style-type: none"> ◆Platelet Clumping-EDTA Induced Correction R-W-HEM-1317
Giant Platelets	1 st presentation.		Slide review.	
NRBC#: NRBC flag	Check sample. Vortex, if indicated.	See procedure for slide review.	Note: If NRBC present, WBC count may need correction.	LH Cellular Interference M-W-HEM-1320
Dimorphic RBC's	1 st presentation.	AND, no TX history	Slide review.	

Parameter	First Action	Second Action	Final Action	Related Document(s)
Retic Count				
<ul style="list-style-type: none"> ◆ Abn Ret Pattern flag ◆ Verify Retic flag 	See procedure LH Retic Count.		Send sample to SJMC for automated or manual retic count	
%Ret: <0.2 or >25%			Send sample to SJMC for automated or manual retic count	
Neonates				
Neonate: <1.0 mo old			Perform MAN DIFF	

Commonly used comments:

- BKRSRP “Slide Reviewed Previously”
- BKRCLOTCHK “EDTA tube checked for clots”
- BKRSREV “Auto-Diff confirmed by slide review.”
- BKRIMNO “No immature or abnormal cells seen on slide review.”
- BKRCLUMP “Unable to report platelet count due to platelet clumping”
- PLTMORPH or BKRPLTEST- use F2 to open list
 - “Platelets appear adequate”
 - “Platelets appear decreased”
 - “Platelets appear increased”
 - “Platelets appear slightly decreased”
 - “Platelets appear slightly increased”
 - “Platelets appear markedly decreased”
 - “Platelets appear markedly increased”
- WBCCOR “WBC count manually corrected for NRBCs”
- BKRTFC “Too few cells to perform differential.”
- BKRIMPR “Immature or abnormal cells present.”
- PATHREV “Slide submitted for pathologist review.” *This may get added automatically depending on the circumstances.*
- DILUTED “Results obtained by sample dilution.”
- PLASMAREP “Results obtained by plasma replacement.”
- BKRWARM “Sample warmed to 37 degrees. Possible cold agglutinin.”

REFERENCES

Coulter LH750 Series Operator's Guide.

Coulter LH500 Series Operator's Guide

International Consensus Group for Hematology Review, International Society for Laboratory Hematology, 2004.