



Technical Memorandum

TO: Physicians, Staff

From: Wesley Kim, MD, Medical Director
Ana Ortega-Lopez, MD, Medical Director

Date: November 1, 2012

Subject: Hematology System

Diagnostic Laboratory Services continues to look for ways to improve the quality of its laboratory services. Beginning November 12, 2012, DLS will be switching to fully automated Hematology analyzers and Transport Systems. This allows us to automate and standardize many internal laboratory procedures related to specimen processing, analysis, and resulting. This will improve the quality and reliability of test results, reduce turn-around time, improve efficiency, and increase overall quality of our services to our clients and their patients.

With the new Hematology analyzers, WBC automated differential at Central and QMC laboratory will change from a 5-part differential to a 6-part differential, which includes an immature granulocyte (IG) count (% and absolute). The IG count includes metamyelocytes, myelocytes, and promyelocytes. IG is separated out from neutrophils and bands, and is part of the 100% automated differential.

DLS is also pleased to offer a new parameter, Reticulated Hemoglobin (RET-He). In the literature, RET-He has been reported to help aid in the diagnosis of functional iron deficiency, help to monitor patients undergoing erythropoietin therapy, used as a monitor of erythropoiesis, and to even monitor athletes for possible performance enhancing drugs misuse.

RET-He will be performed as part of the Retic% order. Testing related to Reticulocytes can be ordered as follows:

Test Name	Order Code	Specimen Requirement	Specimen Rejection	CPT
Reticulocyte	5560 or 5563	EDTAk2 (Lavender)	Frozen, clotted, contaminated, hemolyzed, over filled tube, under filled tube, specimen older than stability limits	85045
Reticulocyte with RET-He	5690 or 5693	EDTAk2 (Lavender)	Frozen, clotted, contaminated, hemolyzed, over filled tube, under filled tube, specimen older than stability limits	85046

Attached is also a list of the various CBC parameters, including the current reference ranges and the new expected reference ranges which will be changing over on November 12. For the majority of these parameters, the reference range and reported values will show little variation between the current and new systems. For a few parameters, DLS will be adopting expanded age related reference ranges as determined by the manufacturer, validated by DLS, and following comparison with ranges published in the literature.

Reference Ranges for Hematology instrumentation, effective November 12, 2012 (Page 1)

Analyte / Parameter	Units	Old Reference Range	New Reference Range
White Blood Cell Count	x10 ³ /μL	1W: 9.0-30.0 18Y: 3.8-10.8 Adult: 3.8-10.8	1W: 9.00-30.00 2W: 8.04-15.40 1M: 7.80-15.91 2M: 7.05-14.99 6M: 6.00-13.32 2Y: 5.98-13.51 6Y: 4.86-13.38 12Y: 4.27-11.40 18Y: 3.84-9.84 Adult: 3.80-10.80
Red Blood Cell Count	x10 ⁶ /μL	1W: 4.90-6.00 23D: 3.72-6.12 37D: 3.15-5.55 50D: 3.10-5.10 3M: 2.75-4.75 4M: 3.08-4.68 7M: 3.21-5.21 10M: 3.55-5.15 1Y: 3.64-5.24 3Y: 3.65-5.25 5Y: 3.65-5.65 10Y: 3.80-5.80 Adult M: 4.00-6.20 Adult F: 3.60-5.40	1W: No Change 23D: No Change 37D: No Change 50D: No Change 3M: No Change 4M: No Change 7M: No Change 10M: No Change 1Y: No Change 3Y: No Change 5Y: No Change 10Y: No Change Adult M: No Change Adult F: No Change
Hemoglobin	g/dL	1W: 15.0-21.0 23D: 12.7-18.7 37D: 10.3-17.9 50D: 9.0-16.6 3M: 9.2-13.6 4M: 9.6-12.8 7M: 10.1-12.9 10M: 10.5-12.9 1Y: 10.7-13.1 3Y: 10.8-12.8 5Y: 10.7-14.7 10Y: 10.8-15.6 Adult M: 14.0-18.0 Adult F: 12.0-16.0	1W: No Change 23D: No Change 37D: No Change 50D: No Change 3M: No Change 4M: No Change 7M: No Change 10M: No Change 1Y: No Change 3Y: No Change 5Y: No Change 10Y: No Change Adult M: 13.7-17.5 Adult F: 11.2-15.7
Hematocrit	%	1W: 44.0-70.0 23D: 42.0-62.0 37D: 31.0-59.0 50D: 30.0-54.0 3M: 30.0-46.0 4M: 31.0-43.0 7M: 32.0-44.0 10M: 35.0-43.0 1Y: 35.0-43.0 3Y: 35.0-43.0 5Y: 31.0-43.0 10Y: 33.0-45.0 Adult M: 42.0-54.0 Adult F: 36.0-48.0	1W: 42.0-67.0 23D: 40.0-59.0 37D: 29.0-56.0 50D: 28.0-51.0 3M: 28.0-43.0 4M: 29.0-40.0 7M: 30.0-41.0 10M: 33.0-40.0 1Y: 33.0-40.0 3Y: 33.0-40.0 5Y: 29.0-40.0 10Y: 31.0-42.0 Adult M: 40.1-51.0 Adult F: 34.1-44.9
MCV	fL	1W: 106.0-127.0 23D: 84.0-128.0 37D: 82.0-126.0 50D: 81.0-125.0 3M: 81.0-121.0 4M: 77.0-113.0 7M: 73.0-109.0 10M: 74.0-106.0 1Y: 74.0-102.0 3Y: 73.0-101.0 5Y: 72.0-88.0 10Y: 69.0-93.0 Adult: 82.0-101.0	1W: No Change 23D: No Change 37D: No Change 50D: No Change 3M: No Change 4M: No Change 7M: No Change 10M: No Change 1Y: No Change 3Y: No Change 5Y: No Change 10Y: No Change Adult: 79.4-98.4

Analyte / Parameter	Units	Old Reference Range	New Reference Range
MCH	pg	1W: 29.0-45.0 23D: 26.0-38.0 37D: 26.0-38.0 50D: 25.0-37.0 3M: 24.0-36.0 4M: 23.0-35.0 7M: 21.0-33.0 10M: 21.0-33.0 1Y: 23.0-31.0 3Y: 23.0-31.0 5Y: 23.0-31.0 10Y: 22.0-34.0 Adult: 26.0-34.0	1W: No Change 23D: No Change 37D: No Change 50D: No Change 3M: No Change 4M: No Change 7M: No Change 10M: No Change 1Y: No Change 3Y: No Change 5Y: No Change 10Y: No Change Adult: No Change
MCHC	g/dL	1W: 28.6-34.6 23D: 26.0-34.0 37D: 25.0-37.0 50D: 26.0-34.0 3M: 26.0-34.0 4M: 26.0-34.0 7M: 26.0-34.0 10M: 28.0-32.0 1Y: 28.0-32.0 3Y: 26.0-34.0 5Y: 32.0-36.0 10Y: 32.0-36.0 Adult: 32.0-36.0	1W: No Change 23D: No Change 37D: No Change 50D: No Change 3M: No Change 4M: No Change 7M: No Change 10M: No Change 1Y: No Change 3Y: No Change 5Y: No Change 10Y: No Change Adult: No Change
Neutrophil	%	6D: 46-76 1W: 30-60 2W: 25-55 1M: 25-45 1Y: 22-42 4Y: 23-45 8Y: 38-68 14Y: 40-80 Adult: 40-80	6D: 46.0-76.0 1W: 30.0-60.0 2W: 25.0-55.0 1M: 25.0-45.0 1Y: 22.0-42.0 4Y: 23.0-45.0 8Y: 38.0-68.0 14Y: 40.0-80.0 Adult: 34.0-72.0
Abs Neutrophils	$\times 10^3/\mu\text{L}$	1W: 5.00-21.00 2W: 1.00-9.50 1M: 1.00-9.00 1Y: 1.00-8.50 4Y: 1.50-8.50 8Y: 1.50-8.00 14Y: 1.80-8.00 Adult: 1.80-7.70	1W: No Change 2W: No Change 1M: No Change 1Y: No Change 4Y: No Change 8Y: No Change 14Y: No Change Adult: 1.56-6.20
Lymphocyte	%	6D: 26-36 1W: 31-51 2W: 38-58 1M: 40-70 1Y: 45-75 4Y: 35-65 8Y: 30-50 14Y: 26-46 Adult: 12-44	6D: 26.0-36.0 1W: 31.0-51.0 2W: 38.0-58.0 1M: 40.0-70.0 1Y: 45.0-75.0 4Y: 35.0-65.0 8Y: 30.0-50.0 14Y: 26.0-46.0 Adult: 12.0-44.0
Monocyte	%	6D: 0-12 1W: 0-18 2W: 0-18 1M: 0-16 1Y: 0-14 4Y: 0-12 8Y: 0-10 14Y: 0-12 Adult: 0-12	6D: 0-12.0 1W: 0-18.0 2W: 0-18.0 1M: 0-16.0 1Y: 0-14.0 4Y: 0-12.0 8Y: 0-10.0 14Y: 0-12.0 Adult: 0-12.0

Reference Ranges for Hematology instrumentation, effective November 12, 2012 (Page 3)

Analyte / Parameter	Units	Old Reference Range	New Reference Range
Eosinophil	%	6D: 0-6	6D: 0-6.0

		1W: 0-10 2W: 0-10 1M: 0-8 1Y: 0-8 4Y: 0-8 8Y: 0-8 14Y: 0-8 Adult: 0-7	1W: 0-10.0 2W: 0-10.0 1M: 0-8.0 1Y: 0-8.0 4Y: 0-8.0 8Y: 0-8.0 14Y: 0-8.0 Adult: 0-7.0
Basophil	%	6D: 0-2 1W: 0-2 2W: 0-2 1M: 0-2 1Y: 0-2 4Y: 0-2 8Y: 0-2 14Y: 0-2 Adult: 0-2	6D: 0-2.0 1W: 0-2.0 2W: 0-2.0 1M: 0-2.0 1Y: 0-2.0 4Y: 0-2.0 8Y: 0-2.0 14Y: 0-2.0 Adult: 0-2.0
Immature Granulocytes	%		All: 0.0-0.6
Absolute Immature Granulocytes	X10 ³ /uL		All: 0.00-0.04
Nucleated RBC	/100WBC	None	3D: 0.1-8.3 1M: 0.0-0.0 2M: 0.0-0.0 6M: 0.0-0.0 2Y: 0.0-0.0 6Y: 0.0-0.0 12Y: 0.0-0.0 17Y: 0.0-0.0 Adult: 0.0-0.2
Platelet Count	x10 ³ /uL	140-440	2W: 144-449 1M: 248-586 2M: 229-597 6M: 244-580 2Y: 206-459 6Y: 189-403 12Y: 199-369 17Y: 175-345 Adult: 151-369
RDW	%	<14.5	2W: 14.6-17.3 1M: 14.3-16.8 2M: 13.6-16.1 6M: 12.2-15.3 2Y: 12.7-15.6 6Y: 12.4-14.9 12Y: 12.2-14.4 17Y: 12.3-14.6 Adult: 11.6-14.4
Reticulocyte Count	%	0.5-1.5	3D: 3.47-5.40 1M: 1.06-2.37 2M: 2.12-3.47 6M: 1.55-2.70 2Y: 0.99-1.82 6Y: 0.82-1.45 12Y: 0.98-1.94 17Y: 0.90-1.49 Adult: 0.64-2.26
Reticulated Hemoglobin (RET-He)	pg		All: 24.1-38.9

If you have any questions or concerns, please contact DLS Client Services at 589-5101, or Dr. Wesley J. Kim at 589-5131.