



Technical Memorandum

TO: Our Valued Clients

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DLS Medical Director QMC Lab Director Lab Director

DATE: July 07, 2025

SUBJECT: New Chemistry & Immunology Instrumentation and Reference Ranges

Diagnostic Laboratory Services, Inc. (DLS) continues to work on improving its quality and efficiency to provide improved services to our clients and their patients. We have been with our current system for 7 years and after much investigation, DLS has made the decision to upgrade all of our Chemistry and Immunology testing platforms.

Effective July 14, 2025, the DLS Halawa Central Lab will be transitioning from ROCHE to new Beckman automated instrumentation. This will improve operational efficiency while offering flexibility to expand our test menu in the future.

The following table summarizes changes to reference ranges and possible reportable ranges that will occur when moving from the current Roche system to the new Beckman analyzers for Chemistry and Immunoassay testing:

Analyte	Units	CURRENT Reference Range	NEW Reference Range	CURRENT Reportable Range	NEW Reportable Range
25-OH Vitamin D	ng/mL	20 - 50	No Change	7 - 240	7.0-120.0
AAT (Alpha1-Antitrypsin)	mg/dL	90 - 200	84-218	20 - 1200	30-5000
AFP Non-Maternal, Serum	ng/mL	≤9.0	No change	2.7 - 60500	0.5-303000.0
Albumin	g/dL	3.5 - 5.2	14D 3.0-3.9 12M 2.2-4.8 15Y 3.6-5.2 ≥16Y 3.5-5.7	1.5 - 18.0	No Change
Alkaline Phosphatase	U/L	1D <250 5D <231 6M <449 1Y <462 3Y <281 6Y <269 12Y <300 17Y <390 ≥18Y 35-129	No Change	5 - 15000	No Change
ALT	U/L	0 - 41	7 - 52	5 - 20000	No Change
Amylase	U/L	28 - 110	29 - 103	10 - 20000	No Change
Anti-CCP	U/mL	<17.0	<3.0	8.0 - 403.0	0.5-300.0

Analyte	Units	CURRENT Reference Range	NEW Reference Range	CURRENT Reportable Range	NEW Reportable Range
ASO (Anti-Streptolysin O)	IU/mL	16Y ≤150 ≥17Y ≤200	ALL: ≤250	20 - 3660	100-10000
AST (SGOT)	U/L	0-40	13 - 39	3 - 20000	No Change
Anti-TPO Microsomal Ab	IU/mL	<34	<9	15 - 600	1-901
Anti-Thyroglobulin Ab	IU/mL	<4.0	No Change	1.0 – 2,500.0	0.9-2,250.0
Bilirubin, Direct	mg/dL	≤0.3	No Change	0.0 - 30.0	No Change
Bilirubin, Total	mg/dL	1D ≤8.0 2D ≤14.0 4D ≤17.0 2W 0-12.0 16Y 0-1.0 >17Y 0-1.2	No Change	0.0 - 60.0	No Change
BMG (Beta2 Microglobulin)	Changes	0.8 - 2.5 mg/L	0.097-0.184 mg/dL	0.3 to endpoint	0.050-16.000
BUN (Urea Nitrogen)	mg/dL	6 - 23	7 - 25	2 - 390	No Change
C3 Complement	mg/dL	90 - 180	87-200	4 to endpoint	15-5,000
C4 Complement	mg/dL	10 - 40	19-52	2 - 200	8-1,500
CA 19-9	U/mL	≤35	No Change	9 to endpoint	1 to endpoint
CA 125	U/mL	<35	No Change	3 – 15,000	1-90,000
Calcium	mg/dL	ALL: 8.3 - 10.5	9D 7.6 - 10.4 1Y 9.0 - 11.0 11Y 8.8 - 10.8 >12Y 8.6 - 10.3	4.0 - 54.0	No Change
CEA	ng/mL	0 - 4.7	≤ 3.0	1.8 – 50,000.0	0.1-850.0
Ceruloplasmin	mg/dL	MALE ≥1Y: 15 - 30 FEMALE ≥1Y: 16 - 45	ALL: 20-60	3 - 420	6-1,000
Chloride	mEq/L	95 - 108	98 - 107	50 - 200	No Change
Cholesterol, Total	mg/dL	<200	No Change	25 – 7,000	No Change
CK, Total	U/L	Male ALL: 39-308 Female ALL: 26-192	No Change	10 – 80,000	No Change
CO2	mEq/L	21 - 30	21 - 31	2 – 45	No Change
Cortisol, No Time	ug/dL	N/A	N/A	1.0 - 634.0	0.4-120.0
Cortisol, A.M.	ug/dL	6.0 - 25.0	6.7-22.6	1.0 - 634.0	0.4-120.0
Cortisol, P.M.	ug/dL	3.0 - 16.0	<10	1.0 - 634.0	0.4-120.0
C-Peptide	ng/mL	1.1 - 4.4	0.73-4.37	0.1 - 40.0	0.06-264.00
Creatinine	mg/dL	0.6 - 1.4	0.6 - 1.3	0.2 - 75.0	No Change
CRP	mg/L	0.0 - 10.0	< 5.0	5.0 - 900.0	No Change
CRP (High Sensitivity)	mg/L	In auto comments <1.0 LOW 1.0 - 3.0 AVERAGE >3.0 HIGH	No Change	0.1-300.0	0.2-80.0
Cystatin C	mg/L	0.60-0.97	No Change	0.40 - 6.80	0.49-7.07

Analyte	Units	CURRENT Reference Range	NEW Reference Range	CURRENT Reportable Range	NEW Reportable Range
DHEA-S	ug/dL	MALE: 20Y: 80 – 537 30Y: 85 – 690 40Y: 74 – 464 50Y: 51 – 368 60Y: 38 – 313 70Y: 24 – 244 ≥71Y: 5 – 253 FEMALE: 20Y: 51 -321 30Y: 50 – 391 40Y: 23 – 266 50Y: 19 – 231 60Y: 13 – 188 70Y: 12 – 133 ≥71Y: 7 – 177	MALE: 21Y: 24 – 537 30Y: 85 – 690 40Y: 106 – 464 50Y: 70 – 495 60Y: 38 – 313 70Y: 24 – 244 ≥71Y: 5 – 253 FEMALE: 21Y: 51 -321 30Y: 18 – 391 40Y: 23 – 266 50Y: 19 – 231 60Y: 8 – 188 70Y: 12 – 133 ≥71Y: 7 – 177	3 to endpoint	2 to endpoint
Digoxin	ng/mL	0.6 - 2.0	0.8 - 2.0	0.3 - 10.0	No Change
Erythropoietin (EPO)	mIU/mL	2.6 - 26.8	2.6-18.5	1.0 - NO UPPER LIMIT	0.6 to endpoint
Estradiol	pg/mL	MALE: <61 FEMALE: FOLLICULAR: 12 – 233 OVULATION: 41 – 398 LUTEAL: 22 – 341 POSTMENOPAUSE: <138	MALE ≥19Y: <31.6 FEMALE: Early Follicular: 22.4 – 115.0 Mid Follicular: 25.0 – 115.00 Ovulatory Peak: 32.1 – 517.0 Mid Luteal: 36.5 – 246.0 Postmenopause: <25.2 PEDIATRIC: Pediatric Male 0-1Y: <38.3 Pre-puberty Male 1-11Y: <15.0 Puberty Male 12-18Y: <34.9 Pediatric Female 0-1Y: <38.3 Pre-puberty Female 1-11Y: <16.1 Puberty Female 12-18Y: <196.1	7 – 30,000	15.0-8,000.0
Ferritin	ng/mL	MALE ALL: 30 – 400 FEMALE: 49Y: 13 - 200 ≥50Y: 22 - 300	MALE ALL: 23.9-336.2 FEMALE ALL: 11.0-306.8	4 – 100,000	0.6-75,000.0
Folate, Serum	ng/mL	>3.1	>5.8	2.0 - 20.0	1.0-22.3
FSH	mIU/mL	MALE: 1.5 - 12.4 FEMALE: FOLLICULAR: 3.5 – 12.5 MID CYCLE: 4.7 – 21.5 LUTEAL:	MALE: 1.3-19.3 FEMALE: Mid-Follicular: 3.9 – 8.8 Mid Cycle: 4.6 – 21.5 Mid-Luteal:	1.0 - 200.0	1.2-400.0

Analyte	Units	CURRENT Reference Range	NEW Reference Range	CURRENT Reportable Range	NEW Reportable Range
		1.7 – 7.7 POSTMENOPAUSE: 25.8 – 134.8	1.8 – 5.1 Postmenopause: 16.8 – 113.6		
Gamma GT	U/L	8 - 61	9 - 64	3 – 12,000	No Change
Glucose	mg/dL	4M 70 – 99 ≥5M 70 – 99	1D 40 - 60 2D 50 - 80 4M 70-99 ≥5M 70 - 99	10-1,600	No Change
Haptoglobin	mg/dL	30 - 200	44-215	10 – 1,140	30-4,000
hCG, Quantitative, Pregnancy	mIU/mL	Non-Pregnant <5	Non-Pregnant <6	1 – 248,400	No Change
hCG, Quatitative, Tumor	mIU/mL	<3	No Change	1 – 248,400	No Change
HDL-Cholesterol	mg/dL	≥40	No Change	3 – 200	No Change
Homocysteine	umol/L	ALL: <15.0	ALL Up to 60 yrs: 5-15 ALL >60 yrs: 5-20	3.0 - 100.0	2.0-44.0
IgA	mg/dL	1Y 0 - 83 3Y 20 - 100 6Y 27 - 195 9Y 34 - 305 11Y 53 - 204 13Y 58 - 358 15Y 47 - 249 19Y 61 - 348 ≥20Y 70 - 400	ALL: 66-433	10 – 6,400	10-7,000
IgE	IU/mL	1W <1.5 1Y <15 5Y <60 9Y <90 15Y <200 ≥16Y <100	6Y ≤440.0 19Y ≤450.0 ≥20Y ≤160.0	1.0 – 50,000.0	20.0-50,000.0
IgG	mg/dL	1Y 232 – 1,411 3Y 453 - 916 6Y 504 – 1,464 9Y 572 – 1,474 11Y 698 – 1,560 13Y 759 – 1,549 15Y 716 – 1,711 19Y 549 – 1,584 ≥20Y 700 – 1,600	635-1,741	300 – 27,500	75-30,000
IgM	mg/dL	1Y 0 - 145 3Y 19 - 146 6Y 24 - 210 9Y 31 - 208 11Y 31 - 179 13Y 35 - 239 15Y 15 - 188 19Y 23 - 259 ≥20Y 40 - 230	45-281	25 – 5,850	20-5,000
Insulin	uIU/mL	2.6 - 24.9	1.9-23.0	2.0 – 1,000.0	0.1-3,000.0
Iron	ug/dL	MALE ALL: 45 – 160 FEMALE ALL: 30 - 160	MALE/FEMALE ALL: 50-212	5 – 2,100	10-2,000
LDH, Total	U/L	ALL: 135 - 250	MALE: 14D 309 – 1,222 12M 163 - 452 9Y 192 - 321	25 - 6,000	No Change

Analyte	Units	CURRENT Reference Range	NEW Reference Range	CURRENT Reportable Range	NEW Reportable Range
			14Y 170 - 283 >15Y 130 - 250 FEMALE: 14D 309 – 1,222 12M 163 - 452 9Y 192 - 321 14Y 157 - 272 >15Y 130 - 250		
LDL-Cholesterol, Direct	mg/dL	<100	<100	4 – 1,096	7-400
LH	mIU/mL	MALE: 1.7 - 8.6 FEMALE: FOLLICULAR: 2.4 – 12.6 MID CYLCE: 14.0 - 95.6 LUTEAL: 1.0 – 11.4 POSTMENOPAUSE: 7.7 – 58.5	MALE: 1.2 – 8.6 FEMALE: Mid-Follicular: 2.1 – 10.9 Mid-Cycle: 19.2 – 103.0 Mid-Luteal: 1.2 – 12.9 Postmenopause: 10.9 – 58.6	1.0 - 200.0	0.2-250.0
Lipase	U/L	13 - 60	11 – 82	3 – 6,000	No Change
Magnesium	mg/dL	1.6 - 2.6	1.9 - 2.7	0.5 - 24.0	No Change
Phenytoin (Dilantin)	ug/mL	10.0 - 20.0	No Change	2.5 - 120.0	No Change
Phosphorus	mg/dL	1W 4.5 - 6.5 15Y 2.4 - 6.5 >16Y 2.5 - 4.5	14D 5.6 - 10.5 12M 4.8 - 8.4 ≥13M 3.7 - 7.2	1.0 - 100.0	No Change
Potassium	mEq/L	1D 3.7 - 5.9 2Y 4.1 - 5.3 12Y 3.4 - 4.7 ≥13Y 3.3 - 5.1	No Change	1.0 - 10.0	No Change
PreAlbumin	mg/dL	20 - 40	17 – 34	3 - 240	No Change
Progesterone	ng/mL	MALE: <0.2 FEMALE: FOLLICULAR PHASE: <1.0 OVULATION PHASE: <12.1 LUTEAL PHASE: 1.8 - 23.9 POSTMENOPAUSE: <0.2	MALE: <0.42 NON-PREGNANT FEMALES: Follicular Phase: <1.87 Ovulation Phase: 0.20 – 2.07 Luteal Phase: <17.79 ng/mL Postmunopausal: <0.38 PREGNANT FEMALES: 1 st Trimester: 0.68 – 63.70 2 nd Trimester: 17.40 – 87.50	0.2 - 600.0	0.20-400.00
Prolactin	ng/mL	MALE ALL: 4.1-15.2 FEMALE ALL: 4.8-23.3	MALE ALL: 2.64-13.13 FEMALE: <50Y: 3.34-26.72 ≥50Y: 2.74-19.64	1.0 – 4,630	0.25-2,000.00
Protein, Total	g/dL	ALL: 6.4 - 8.3	14D 4.4 - 7.6 12M 5.1 - 7.3	3.0 - 36.0	No Change

Analyte	Units	CURRENT Reference Range	NEW Reference Range	CURRENT Reportable Range	NEW Reportable Range
			2Y 5.6 - 7.5 15Y 6.0 - 8.0 >16Y 6.4-8.9		
PSA, Free	%	>25%	No Change	N/A - Calculation	N/A - Calculation
PSA, Total	ng/mL	49Y 0.00 - 2.40 59Y 0.00 - 3.80 69Y 0.00 - 5.60 ≥70Y 0.00 - 6.90	ALL ≤4.00	0.02-5,000.00	0.02-1,420.00
PTH, Intact	pg/mL	15 - 65	12-88	6 – 5,000	2 – 28,000
Rheumatoid Factor	IU/mL	<14	No Change	10 - 650	10-120
Rubella, IgG	IU/mL	INTERPRETATION: <10 Non-Reactive ≥10 Reactive	INTERPRETATION: <10 Non-Reactive 10-14 Equivocal ≥15 Reactive	4 - 500	10-450
Sodium	mEq/L	133 - 145	136 - 145	50 - 200	No Change
T3, Free	pg/mL	2.0 - 4.4	2.5-3.9	1.0 - 32.6	0.9-30.0
T3,Total	ng/dL	80 - 200	87.0-178.0	26 - 650	42.0-736.0
T4, Free	ng/dL	0.9 - 2.1	0.61 - 1.12	0.32 - 5.60	No Change
Testosterone	ng/dL	MALE: 49Y 249 - 836 ≥50Y 193 - 740 FEMALE: 49Y 8 - 48 ≥50Y 3 - 41	MALE ALL: 175-781 FEMALE ALL: <75	3 – 1,300	40-1,600
Thyroglobulin	ng/mL	<50.0	1.59-50.03	0.3 – 45,000.0	0.10-450.00
Transferrin	mg/dL	200 - 360	203-362	10 - 780	75-7,500
Triglycerides	mg/dL	<150	No Change	10 – 10,000	No Change
TSH	uIU/mL	1D 9.20 - 28.40 2D 6.60 - 15.60 3D 0.83 - 8.65 1M 0.67 - 5.57 ≥2M 0.27 - 4.20	1D 9.20 -28.40 2D 6.60 - 15.60 3D 0.83 - 8.65 1M 0.67 - 5.57 ≥2M 0.45 - 5.33	0.01 - 460.00	No Change
Iron Binding Capacity	ug/dL	228-428	No Change	N/A	N/A
Saturation	%	20-50	No Change	N/A	N/A
Uric Acid	mg/dL	MALE ALL: 3.4 - 7.0 FEMALE ALL: 2.4 - 5.7	MALE ALL: 4.4 - 7.6 FEMALE ALL: 2.3 - 6.6	1.5 - 60.0	No Change
Urine Albumin (Microalbumin)	mg/L	24-hr ALL: <30.0	No Change	12.0 – 4,400.0	7.0 – 2,250.0
Urine Amylase	U/L	24-hr ALL: 40 - 330	No Change	3 – 7,500	10-15,000
Urine Calcium	mg/dL	24-hr ALL: 100-300	No Change	1.0 - 125.0	0.1-400.0
Urine Creatinine	mg/dL	24-hr MALE: 1.0 - 2.0 24-hr FEMALE: 0.7 - 1.6	No Change	1.0 – 3,000.0	No Change
Urine Magnesium	mg/dL	24-hr ALL: 60 - 210	24-hr ALL: 24-255	1.4 - 53.4	0.5-10.0
Urine Phosphorus	mg/dL	24-hr ALL: 400 – 1,300	24-hr ALL: 300-1,300	5 to endpoint	10 to endpoint
Urine Protein	mg/dL	24-hr ALL: <150	No Change	4 to endpoint	No Change

Analyte	Units	CURRENT Reference Range	NEW Reference Range	CURRENT Reportable Range	NEW Reportable Range
Urine Urea Nitrogen	mg/dL	24-hr ALL: 12 - 20	24-hr ALL: 7-16	11.0 – 10,080.0	20.0-13,000.0
Urine Uric Acid	mg/dL	24-hr ALL: 200 – 1,000	MALE ALL 24-hr: 250-800 FEMALE ALL 24-hr: 250-750	2.2 - 260.0	10.0-1,000.0
Vitamin B12	pg/mL	232 – 1,245	180-914	150 – 2,000	50-7,500

Because numerical changes to results for certain tests can potentially occur when switching instrument manufacturers, consideration should be given to re-baselining patients that are being followed regularly with certain laboratory tests, if clinically indicated.

For more information on all our tests, visit TIL.DLSLAB.com. If you have any questions, please call DLS Client Services at (808) 589-5101 or Dr. Wesley Kim at (808) 589-5131.