



**Rhode Island Hospital
The Miriam Hospital**

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Memorandum

TO: Rhode Island Hospital, The Miriam Hospital and Newport Hospital
Medical Staff, House Staff Officers, Nursing Managers, and Lifespan
Laboratory Outreach Clients

FROM: Ricky Darnell Grisson, II MD, MBA, MPH.
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DATE: June 7, 2024

SUBJECT: New Reference Ranges for Chemistry Tests

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Effective May 29, 2024, Lifespan Clinical Chemistry Laboratory will move over to Abbott Alinity Chemistry and Immunoassay systems for a significant number of the in-house tests. This move to Abbott Diagnostics systems represents an improvement in system standardization, testing quality, resulting turnaround time and operational and cost efficiency. In accordance with clinical laboratory standards surrounding such a cross-over, the following immunoassay reference ranges and courtesy call values have been updated.

Test name	Old Reference Range	New Reference Range
Troponin- I (Male)	3 - 57 ng/L	3 - 35 ng/L
Troponin- I (Female)	3 - 37 ng/L	3 - 14 ng/L
Troponin- I (N-Sex)	3 - 47 ng/L	3 - 27 ng/L
Troponin- I (courtesy call)	>120 ng/L	>64 ng/L

Serum Folate	2.6-20.0 ng/mL	3.5 - 14.7 ng/mL
Vitamin B12	211-911 pg/mL	227 - 1053 pg/mL
Homocysteine	5.0 - 13.9 umol/L	3.6 - 9.9 umol/L
Ferritin (Female/Male)	10-120 / 22-322 ng/mL	5 - 204 / 22 - 275 ng/mL

Beta HCG	0-5 mIU/mL	0-8 mIU/mL
LH	1.5 - 9.3 mIU/mL	1.3 - 6.7 mIU/mL
FSH	1.4 - 18.1 mIU/mL	1.1 - 15.5 mIU/mL
Prolactin (Female)	3 - 29 ng/mL	4 - 40 ng/mL
Prolactin (Male)	2 - 17 ng/mL	3 - 23 ng/mL

TSH	0.350-5.500 uIU/mL	0.330 - 4.120 uIU/mL
T3 (varies by age*)	80-180 ng/dL	66 - 165 ng/dL
Free -T3	230-420 pg/dL	175 - 354 pg/dL

T4	4.5-10.9 ug/dL	4.6 - 10.0 ug/dL
Free -T4	0.8-1.80 ng/dL	0.70 - 1.40 ng/dL

Insulin	3-25 mU/L	2 - 20 mU/L
Cortisol AM	5.5-20.0 ug/dL	5.0 - 14.0 ug/dL
Cortisol PM	3.0-16.0 ug/dL	3.0-11.0 ug/dL
Test name	Old Reference Range	New Reference Range
Vitamin D	30 - 100	27 - 85
PTH	18 - 80 pg/mL	24 - 91 pg/mL

Testosterone (Female)	14-76 ng/dL	18 - 91 ng/dL
Testosterone (Male)	270-1070 ng/dL	317 - 1234 ng/dL
Estradiol (Male)	M 0-39.8 pg/mL	M 3.4 - 38.8 pg/mL

Alpha-fetoprotein	0.0-10.0 ng/mL	0.0- 9.0 ng/mL
CEA	0.0-5.0 ng/mL	0.0-7.0 ng/mL
CA-19-9	0 - 35 U/mL	0 - 42 U/mL
CA-125	0 - 30.2 U/mL	0.2 - 44.1 U/mL

TEST NAME	Old Reference Range	New Reference Range
Albumin	3.5 - 5.0 g/dL	0-1Y = 2.6 - 4.8 g/dL 1-18Y = 3.0 - 4.8 g/dL >18Y= 3.4 - 5.1 g/dL
Alkaline Phosphatase	34 - 104 IU/L	*Varies with age adult: 39 - 117 IU/L
ALT	6 - 45 IU/L	*Varies with age adult: 7 - 49 IU/L
Ammonia	2 - 50 umol/L	1 - 39 umol/L
Amylase	28 - 100 U/L	38 - 136 IU/L
AST	10 - 42 IU/L	*Varies with age >20Y: 12 - 52 IU/L
Calcium	8.5 - 10.5 mg/dL	0-1Y = 8.9 - 10.6 mg/dL 1-3Y = 8.8 - 10.1 mg/dL >3Y= 8.4 - 10.2 mg/dL
Carbamazepine	4 - 12 ug/mL	3 - 11 ug/mL
Creatine Kinase (CK)	Adult male: 20-210 IU/L Adult female:20-165 IU/L Adult N sex: 20-165 IU/L	*Varies by age/gender >15Y male: 22 - 247 IU/L >15Y female: 22-194 IU/L > 15Y N Sex: 22 -194 IU/L
Bicarbonate	22 - 32 meq/L	20 - 29 mEq/L
Direct Bilirubin	0.0 - 0.3 mg/dL	0 - 0.4 mg/dL
eGFR (CKD-EPI 2021)	< 90 mL/min/1.73m ²	< 60 mL/min/1.73m ²
GENTAMICIN (trough)	0 - 2 ug/mL	0 - 1 ug/mL
GENTAMICIN (peak)	5 - 10 ug/mL	4 - 8 ug/mL
TEST NAME	Old Reference Range	New Reference Range

GGT	10 - 70 IU/L	*Varies with age/gender > 19Y: 12 - 85 IU/L
IgE	*Varies with age >=17Y 3-209 IU/mL	*Varies with age >=18Y 2-214 IU/mL
LDH	100 - 220 IU/L	119 - 265 IU/L
Lipase	10 - 60 IU/L	13 - 55 IU/L
Transferrin	*Varies by age/gender 14-60Y male: 180-382 mg/dL 14-60Y female: 174-364 mg/dL 14-60Y N Sex: 180-364 mg/dL	*Varies by age/gender 14-60Y male: 185-389 mg/dL 14-60Y female: 179-371 mg/dL 14-60Y N Sex: 185-371 mg/dL
Total Bilirubin	0.2-1.3 mg/dL	*Varies with age > 19Y: 0.1 - 1.2 mg/dL
Total Protein	6.0 - 8.0 g/dL	*Varies with age > 19Y: 6.1 - 8.3 g/dL
Urinary Amylase	Male: 16 - 491 Female: 21 - 447	Females: 26- 580 U/L Males: 19 - 637 U/L
Triglycerides	0-9Y = 30 - 74 mg/dL 9-19Y = 30 - 89 mg/dL >19Y = 40 - 149 mg/dL	0-9Y = 20 - 69 mg/dL 9-19Y = 28 - 89 mg/dL >19Y = 37 - 141 mg/dL
Uric Acid	*Varies by age/gender >18Y male: 3.5 - 8.5 mg/dL >18Y female: 2.6 - 6.0 mg/dL >18Y N Sex: 3.5 - 6.0 mg/dL	*Varies by age/gender >18Y male: 2.7 - 6.3 mg/dL >18Y female: 3.7 - 8.9 mg/dL >18Y N Sex: 3.7 - 6.3 mg/dL
Vancomycin (trough)	10 - 20 ug/mL	10 - 20 ug/mL
Vancomycin (peak)	30 - 40 ug/mL	30 - 40 ug/mL

Additional important caveats about these reference range changes are as follows:

1. A complete compendium of reference range changes can be found in the online lab guide, especially when the reference range “varies by age or gender.”
2. In order to continue delivering inclusive clinical testing services, Lifespan Laboratories is continuing its previous strategy of using the “N Sex” system prompt to provide reference range information that aligns with the patient’s gender identity as lab report comments. Thus the “N Sex” ranges exist only to prompt the laboratory information system to append gender-identity appropriate comments.
3. We have updated the calculation for estimating the glomerular filtration rate to the CKD-epi 2021 race free equation as promoted by the NIDDK, ASN and NKF.
4. As tumor markers are not universally standardized, patients must be crossed-over from one tumor marker to the other. This clinical cross-over will take place for the next three months, so please coordinate with your patients to make sure that this cross over testing occurs.
5. Cardiac specific troponin I represents a consolidation of platforms at RIH, TMH and NH. Thus, while troponin I will be orderable and performed at NH, RIH and TMH, the NH specific Troponin I assay, performed on Beckman-Coulter systems, is being discontinued.

For questions, comments or concerns, please do not hesitate to contact the Clinical Chemistry Laboratory: Ricky Grisson, II MD, MPH (793-4298), Deb Smeal (444-5217), Ean Larson (793-2526), Kraig Ruth (845-1104) or Kim Paiva (793-4237).