



CLINICAL LABORATORY MEMORANDUM

Date: 2/10/2021

To: CAMC LabWorks Clients
CAMC Providers

From: Milton Plata, MD
Laboratory Director - CAMC

Milton Plata MD
D. Gruetter MD
2/15/2021 2/15/2021

Darlene Gruetter, MD
Laboratory Director – CAMC Teays Valley

Beginning **February 10th, 2021**, CAMC Laboratories and CAMC LabWorks will be offering several new tests with pediatric reference ranges. We have performed a correlation study with Mayo Medical Laboratories (MML) which allowed us to adopt their reference ranges. The study was completed by analyzing pediatric specimens from MML and performing a method comparison. The method comparison met all acceptable limits.

The tests now performed at CAMC Laboratory include Sex Hormone Binding Globulin (SHBG), Dehydroepiandrosterone Sulfate (DHEAS-S), Human Growth Hormone (GH), Estradiol, Luteinizing Hormone (LH), Follicle Stimulating Hormone (FSH), Prolactin, Testosterone, Thyroid Stimulating Hormone (TSH), Free T3, and Free T4. Listed below are the established reference ranges for each.

• **SHBG:**

Gender:	Age Range:		Reference Range: nmol/L	
Males	0 minutes	7 years	31	167
Males	8 years	11.5 years	49	179
Males	12 years	13.6 years	5.8	182
Males	14 years	15 years	14	98
Males	16 years	18 years	10	57
Females	0 minutes	7 years	43	197
Females	8 years	10 years	7.7	119
Females	10.5 years	12 years	31	191
Females	12.3 years	13 years	31	166
Females	13 years	14.5 years	18	144

Adults 18 years or older:

Males:	10-57 nmol/L
Females (Non-pregnant)	18-144 nmol/L

- **DHEA-S:**

Gender:	Age Range:		Reference Range µg/dL:	
Males	0 Minutes	14 Days	11	120
Males	15 Days	12 years	14	323
Males	12 years	14 years	5.5	312
Males	14 years	15 years	29	412
Males	15 years	18 Years	104	468
Males	18 years	30 years	105	728
Males	31 years	40 years	57	522
Males	41 years	50 years	34	395
Males	51 years	60 years	20	299
Males	61 years	70 years	12	227
Males	71 years	150 years	6.6	162
Females	0 minutes	14 days	16	96
Females	15 Days	10 years	22	184
Females	10 years	11 years	11	296
Females	11 years	12 years	17	343
Females	12 years	15 years	57	395
Females	15 years	30 years	83	377
Females	31 years	40 years	45	295
Females	41 years	50 years	27	240
Females	51 years	60 years	16	195
Females	61 years	70 years	9.7	159
Females	71 years	150 years	5.3	124

- **Growth Hormone:**

Reference Ranges:

Adult Males: 0.003 -0.971 ng/mL

Adult Females: 0.010-3.607 ng/mL

Reference intervals have not been formally verified in-house for pediatric and adolescent patients. The published literature indicates that reference intervals for adult, pediatric, and adolescent patients are comparable.¹¹

¹¹ Mayo Medical Laboratories Reference Ranges. 2020.

<https://www.mayocliniclabs.com/test-catalog/Clinical+and+Interpretive/8688>

- **Estradiol:**

Estradiol Level	14 Days	7 Years	Male	pg/mL	0	13
Estradiol Level	7 Years	12 Years	Male	pg/mL	0	16
Estradiol Level	12 Years	14 Years	Male	pg/mL	0	26
Estradiol Level	14 Years	15 Years	Male	pg/mL	0	38
Estradiol Level	15 Years	18 Years	Male	pg/mL	10	40
Estradiol Level	18 Years	150 Years	Male	pg/mL	20	53
Estradiol Level	0 Minutes	14 Days	Female	pg/mL		
Estradiol Level	14 Days	7 Years	Female	pg/mL	0	20
Estradiol Level	7 Years	10 Years	Female	pg/mL	0	24
Estradiol Level	10 Years	11 Years	Female	pg/mL	0	60
Estradiol Level	11 Years	12 Years	Female	pg/mL	15	85
Estradiol Level	12 Years	15 Years	Female	pg/mL	15	350

Post-Menopausal Females Not on Hormone Therapy: 20-48 pg/mL
Non-Pregnant Females: Not Provided
Mid-Follicular Phase: 27-139 pg/mL
Mid-Luteal Phase: 49-338 pg/mL
Peri-Ovulatory Phase: 95-495 pg/mL

- Luteinizing Hormone (LH):**

Gender	Age	Reference Ranges (mIU/mL)
Male	0-1 yr	0.02-5.00
Male	1 yr-8 yrs	0.02-0.50
Male	8 yrs- 10 yrs	0.02-3.60
Male	10 yrs-13 yrs	0.10-5.70
Male	13 yrs-17 yrs	0.80-8.70
Male	17 yrs-150 yrs	1.24-8.62
Female	0-1 yr	0.02-18.3
Female	1 yr-8 yrs	0.02-0.30
Female	8 yrs-10 yrs	0.02-4.80
Female	10 yrs-13 yrs	0.02-11.70
Female	13 yrs-18 yrs	0.02-16.70
Female	>18 yrs Mid-Follicular Phase	2.12-10.89
Female	> 18 yrs Mid Cycle Peak, Mid Luteal Phase	1.20-12.86
Female	>18 yrs Post Menopausal	10.87-58.64

- Follicle Stimulating Hormone (FSH):**

FSH	0 Minutes	1 Years	Male	mIU/mL	0	3.3
FSH	1 Years	5 Years	Male	mIU/mL	0	1.9
FSH	5 Years	10 Years	Male	mIU/mL	0	2.3
FSH	10 Years	15 Years	Male	mIU/mL	0.6	6.9
FSH	15 Years	18 Years	Male	mIU/mL	0.7	9.6
FSH	18 Years	150 Years	Male	mIU/mL	1.27	19.26
FSH	0 Minutes	1 Years	Female	mIU/mL	1.2	12.5
FSH	1 Years	10 Years	Female	mIU/mL	0.5	6
FSH	10 Years	15 Years	Female	mIU/mL	0.9	8.9
FSH	15 Years	18 Years	Female	mIU/mL	0.7	9.6

Mid-Follicular Stage	3.85-8.78 mIU/mL
Mid-Cycle Peak	4.54-22.51 mIU/mL
Mid-Luteal Phase	1.79-5.12 mIU/mL
Post-Menopausal	16.74-113.59 mIU/mL

- **Prolactin:**

Gender	Age	Reference Range (ng/mL)
Male	0-150 yrs	2.64-13.3
Female	0-50 yrs	3.34-26.72
Female	50 yrs-150 yrs	2.74-19.64

- **Testosterone:**

Testosterone Total	0 Minutes	5 Months	Male	ng/dL	75	400
Testosterone Total	5 Months	9 Years	Male	ng/dL	7	20
Testosterone Total	9 Years	11 Years	Male	ng/dL	7	130
Testosterone Total	11 Years	13 Years	Male	ng/dL	7	800
Testosterone Total	13 Years	14 Years	Male	ng/dL	7	1200
Testosterone Total	14 Years	16 Years	Male	ng/dL	100	1200
Testosterone Total	16 Years	18 Years	Male	ng/dL	300	1200
Testosterone Total	18 Years	19 Years	Male	ng/dL	240	950
Testosterone Total	19 Years	150 Years	Male	ng/dL	168	758
Testosterone Total	0 Minutes	5 Months	Female	ng/dL	20	80
Testosterone Total	5 Months	9 Years	Female	ng/dL	7	20
Testosterone Total	9 Years	11 Years	Female	ng/dL	7	44
Testosterone Total	11 Years	16 Years	Female	ng/dL	7	75
Testosterone Total	16 Years	18 Years	Female	ng/dL	20	75
Testosterone Total	18 Years	19 Years	Female	ng/dL	8	60
Testosterone Total	19 Years	150 Years	Female	ng/dL	9	90

- **Thyroid Stimulating Hormone (TSH):**

TSH	0 Minutes	5 Days	Male	mIU/mL	0.7	15.2
TSH	5 Days	2 Months	Male	mIU/mL	0.7	11
TSH	2 Months	11 Months	Male	mIU/mL	0.7	8.4
TSH	11 Months	5 Years	Male	mIU/mL	0.7	6
TSH	5 Years	10 Years	Male	mIU/mL	0.6	4.8
TSH	10 Years	19 Years	Male	mIU/mL	0.5	4.3
TSH	19 Years	180 Years	Male	mIU/mL	0.45	5.33
TSH	0 Minutes	5 Days	Female	mIU/mL	0.7	15.2
TSH	5 Days	2 Months	Female	mIU/mL	0.7	11
TSH	2 Months	11 Months	Female	mIU/mL	0.7	8.4
TSH	11 Months	5 Years	Female	mIU/mL	0.7	6
TSH	5 Years	10 Years	Female	mIU/mL	0.6	4.8
TSH	10 Years	19 Years	Female	mIU/mL	0.5	4.3
TSH	19 Years	180 Years	Female	mIU/mL	0.45	5.33

- **Free T3:**

Free T3	0 Minutes	18 years	All	pg/mL	2.8	4.4
Free T3	18 years	150 Years	All	pg/mL	2.5	3.9

- **Free T4:**

Free T4	0 Minutes	5 Days	All	ng/dL	0.9	2.5
Free T4	5 Days	2 Months	All	ng/dL	0.9	2.2
Free T4	2 Months	11 Months	All	ng/dL	0.9	2
Free T4	11 Months	5 Years	All	ng/dL	1	1.8
Free T4	5 Years	10 Years	All	ng/dL	1	1.7
Free T4	10 Years	19 Years	All	ng/dL	1	1.6
Free T4	19 Years	150 Years	All	ng/dL	0.6	1.3

If you have any concerns or questions about this change, feel free to contact pathologist **Dr. Milton Plata** at **304-388-9351** or Milton.plata@camc.org or **Darlene Gruetter** at **304-757-1768** or Darlene.gruetter@camc.org or **Automated Procedures Laboratory Manager-Della Haynes** at **304-388-4184** or Della.haynes@camc.org Thank you!