

Core Laboratory for Clinical Studies
 Washington University School of Medicine
 Adult Reference Ranges
 Effective 05/05/2023

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 05/05/2023

Chemistry/Endocrinology

Analyte	Units	Reference Range		
		Age Specific	Males	Females
Albumin	g/dL		3.5 - 5.2	
Alkaline Phosphatase	IU/L		35 - 129	
ALT	IU/L		6 - 53	
AST	IU/L		11 - 47	
Bilirubin, Direct	mg/dL		0.00 - 0.30	
Bilirubin, Total	mg/dL		0.2 - 1.4	
C-peptide	ng/mL		1.10 - 4.40 Reference range is for fasting subjects. Non-fasting values may be higher.	
C-reactive protein	mg/L		< 5	
Calcium	mg/dL		8.6 - 10.3	
Chloride	mmol/L		95 - 107	
CK (CPK), Total	IU/L		26 - 308	
CO ₂ Content	mmol/L		21 - 29	
Cortisol	µg/dL		3.3 - 24.8	
Creatinine	mg/dL	18 yrs ≥ 19 yrs	0.4 - 1.0 0.7 - 1.3	0.2 - 0.8 0.6 - 1.1
Estradiol	pg/mL	Follicular: Luteal: Post-Menopausal:	11.3 - 43.2	12.4 - 233 22.3 - 341 0 - 138
Ferritin	ng/mL		22.0-322.0	10.0 - 291.0
Follicle-Stimulating Hormone (FSH)	IU/L	Follicular: Luteal: Post-Menopausal:	1.5 - 12.4	3.5 - 12.5 1.7 - 7.7 25.8 - 134.8
Free T3	pg/mL		2.3 - 4.4	

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Free T4	ng/dL		0.80 - 1.80	
Gamma-GT	IU/L		8 – 61	5 - 36
eGFR (CKD-EPI equation)	ml/min/1.73m ²		>60.0	
Glucose, Fasting	mg/dL	Normal:	64 - 99	
		Impaired Fasting Glucose: Provisional Diagnosis of Diabetes:	100 -125 ≥126	
		Non-Fasting Range:	64 – 199	
Glycated Albumin	%		10.5 – 17.5	
HbA1c	%	Normal:	5.1 – 5.6	
		Prediabetes: Provisional Diagnosis of Diabetes:	5.7 – 6.4 ≥ 6.5	
hs C-Reactive Protein (hsCRP)	mg/L	Cardiovascular Risk Assessment:		
		Low Risk:	< 1.0	
		Average Risk: High Risk:	1.0 – 3.0 > 3.0	
Insulin	μIU/mL		2.6 – 24.9 Reference range is for fasting subjects. Non- fasting levels may vary from 0 to greater than 100 in normal subjects.	
Iron, Total	μg/dL		45 – 160	30 - 160
Iron Binding Capacity, Total	μg/dL		220 - 420	
Iron Saturation	%		15.0 – 60.0	11.0 – 52.0
LDH (LD), Total	IU/L		100 - 250	
LH (Luteinizing Hormone)	IU/L		1.70 – 8.60	
		Follicular:		2.40 – 12.60
		Luteal: Post-Menopausal:		1.00 – 11.40 7.70 – 58.50
Magnesium	mg/dL		1.6 – 2.6	
Phosphorus	mg/dL		2.3 – 4.5	

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Potassium	mmol/L		3.3 - 5.1	
PTH (Parathyroid Hormone)	pg/mL		15 - 65	
Sodium	mmol/L		135 - 145	
Testosterone (Total)	ng/dL		193 - 836	≤ 48.1
Total Protein	g/dL		6.1 - 8.4	
TSH	μIU/mL		0.27 - 4.20	
Urea Nitrogen (BUN)	mg/dL		7 - 23	
Uric Acid	mg/dL		4.1 - 8.5	3.1 - 7.7
Urine Albumin/Creatinine Ratio	mg/g		0.0 - 29.9	
Vitamin B12	pg/mL		232 - 1245	
Vitamin D, 25-Hydroxy	ng/mL		20 - 100 Vitamin D Deficiency = <20 Vitamin D Insufficiency = <30 Unsupplemented normal subjects = <50	

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Lipids and Apolipoproteins
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Analyte	Units	Reference Range	
		Male	Female
Apolipoprotein A1	mg/dL	116 – 185	116 - 210
Apolipoprotein B	mg/dL	47 – 123	
HDL Cholesterol	mg/dL	Male	>40
		Female	>50
LDL Cholesterol	mg/dL	Adults (>19 years)	<190
Lipoprotein(a)	nmol/L	≤ 75	
Non-HDL Cholesterol	mg/dL	<220	
Triglyceride	mg/dL	Desirable (fasting)	<150
		Desirable (nonfasting)	<175
Total Cholesterol	mg/dL	Desirable	<200

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Hematology

Analyte	Units	Reference Range	
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Red Blood Count	M/ μ L	4.06 - 5.63	3.63 - 4.92
Hemoglobin	g/dL	13.0 - 17.5	11.9 - 15.5
Hematocrit	%	40.7 - 50.3	36.1 - 44.3
Mean Corp Volume (MCV)	fL	80.0 - 97.6	
Mean Corp Hemoglobin (MCH)	pg	26.7 - 33.7	
Mean Corp Hgn Cn (MCHC)	g/dL	32.7 - 35.5	
RBC Dist Width (RDW)	%	12.3 - 17.0	
Platelet Count	K/ μ L	140 - 440	
Mean Platelet Volume (MPV)	fL	6.8 - 10.4	
White Blood Count	K/ μ L	3.6 - 11.2	
Neutrophil % Absolute	% K/ μ L	38.7 - 74.5 1.8 - 6.6	
Lymphocyte % Absolute	% K/ μ L	20.0 - 54.3 0.8 - 3.3	
Monocyte % Absolute	% K/ μ L	4.3 - 13.5 0.2 - 1.2	
Eosinophil % Absolute	% K/ μ L	0.0 - 6.0 0.0 - 0.5	
Basophil % Absolute	% K/ μ L	0.0 - 3.0 0.0 - 0.2	
NRBC %	%	0.0 - 0.4	