

Biological Variation Values

Quality Control

Desirable Analytical Quality Specifications for Imprecision, Bias and Total Error Upon Biological Variation

The following values are provided as a service to Bio-Rad customers and are based upon desirable performance.

S = Serum

U = Urine

P = Plasma

B = Blood

CVw = Within-subject biological variation (CVi)

CVb = Between-subject biological variation (CVg)

Imp = Imprecision

TEa = Total Allowable Error

The values are either derived from the 2021 European Federation of Clinical Chemistry and Laboratory Medicine (EFLM) Biological Variation database. Updated and new EFLM values are (denoted with *) or from Ricos C, Alvarez V, Cava F, García-Lario JV, Hernández A, Jiménez CV, Minichela J, Perich C, Simon M. "Current databases on biologic variation: pros, cons and progress" Scand J Clin Lab Invest 1999;59:491-500.

Red = Updated

Blue = New

Matrix	Analyte	Biological Variation		Desirable Specifications		
		CVw	CVb	Imp (%)	Bias (%)	TEa (%)p<0.05
S	11-Deoxycortisol	21.3	31.5	10.7	9.5	27.1
S	17-Hydroxyprogesterone*	28.3	38.6	14.2	12.0	35.3
S	25-hydroxy Vitamin D3*	6.8	30.1	3.4	7.7	13.3
U	5-HIAA (Concentration) 24 h	20.3	33.2	10.2	9.7	26.5
S	5'Nucleotidase	23.2	19.9	11.6	7.6	26.8
S	α 1-Acid glycoprotein*	7.3	24.0	3.7	6.3	12.3
S	α 1-Antitrypsin*	4.1	10.5	2.1	2.8	6.2
S	α 1-Globulin	11.4	22.6	5.7	6.3	15.7
S	α 2-Globulins	10.3	12.7	5.2	4.1	12.6
S	α 2-Macroglobulin	3.4	18.7	1.7	4.8	7.6
U	α-Amylase	94	46	47.0	26.2	103.7
S	α-Amylase*	6.6	24.2	3.3	6.3	11.7
S	α-Amylase, pancreatic*	6.6	25.7	3.4	6.6	12.1
S	γ-Globulin	14.6	12.3	7.3	4.8	16.8
S	γ-Glutamyltransferase*	8.3	45.2	4.2	11.5	18.3
S	Acid phosphatase (ACP)	8.9	8	4.5	3.0	10.3
P	Activated Partial Thromboplastin Time	2.7	8.6	1.4	2.3	4.5
S	Adenosine Deaminase (ADA)	11.7	25.5	5.9	7.0	16.7
P	Adiponectin*	16.9	49.5	8.5	13.1	27.0
S	AFP*	4.5	55.1	2.3	13.8	17.5
P	Alanine	14.7	55.8	7.4	14.4	26.6
S	Alanine aminotransferase*	11.4	35.2	5.7	9.3	18.7
U	Albumin	35	35	17.5	12.4	41.2
S	Albumin*	2.5	4.1	1.3	1.2	3.3
U	Albumin: Creatinine Ratio	30.5	32.5	15.3	11.1	36.3
U	Aldosterone Concentration (24 h)	39.4	40.1	19.7	14.1	46.6
S	Aldosterone*	36.6	34.7	18.3	12.6	42.8
S	Alkaline Phosphatase	6.45	26.1	3.2	6.7	12.0

Matrix	Analyte	Biological Variation		Desirable Specifications		
		CVw	CVb	Imp (%)	Bias (%)	TEa (%)p<0.05
S	Alkaline Phosphatase (Bone)*	6.6	35.6	3.3	9.1	14.5
S	ALP Isoenzyme (Liver)*	6	21	3.0	5.5	10.4
U	Alpha-1-Microglobulin	33	58	16.5	16.7	43.9
P	Alpha-aminobutyric Acid (AABA)	24.7	32.3	12.4	10.2	30.5
U	Aminolevulinic Acid	16	27	8.0	7.8	21.0
U	Ammonia Output (24 h)	24.7	27.3	12.4	9.2	29.6
S	Amyloid Beta, Isoform 1-40*	6.4	12.5	3.2	3.5	8.8
S	Amyloid Beta, Isoform 1-42*	6.2	15.3	3.3	4.2	9.5
S	Androstendione	15.8	38.8	7.9	10.5	23.5
S	Anion Gap	9.5	10.1	4.8	3.5	11.3
P	Antiplasmin Activity	6.2	–	3.1	–	–
P	Antithrombin III	5.2	15.3	2.6	4.0	8.3
S	Apolipoprotein A1*	4.7	8.1	2.4	2.3	6.2
S	Apolipoprotein B*	6.2	21	3.1	5.5	10.6
P	Arginine	19.3	34.1	9.7	9.8	25.7
S	Ascorbic Acid (Vitamin C)	26	31	13.0	10.1	31.6
P	Ascorbic Acid (Vitamin C)	20	21	10.0	7.3	23.8
P	Asparagine	12.3	28	6.2	7.6	17.8
S	Aspartate Aminotransferase*	8.6	19.4	4.3	5.3	12.4
P	Aspartic Acid	31.2	55.1	15.6	15.8	41.6
S	β2-Microglobulin*	4.1	11.5	2.1	3.1	6.4
B	Basophils (Count)*	12.4	28	6.2	7.7	17.9
S	β-Globulins	10.1	9.1	5.1	3.4	11.7
S	Bilirubin (Conjugated)	36.8	43.2	18.4	14.2	44.5
S	Bilirubin (Total)*	20.2	24.6	10.1	8.0	24.6
S	C Peptide	16.6	23.2	8.3	7.1	20.8
S	C3 Complement*	4.6	15.2	2.3	4.0	7.8
S	C4 Complement*	6.9	24.5	3.5	6.4	12.1
S	CA 15.3	6.1	62.9	3.1	15.8	20.8
S	CA 19.9*	4.3	57.4	2.2	14.4	17.9
S	CA 72-4*	50.3	103.4	25.2	28.7	70.2
S	CA 125*	8.7	25.4	4.4	6.7	13.9
s	CA 549	9.1	33.4	4.6	8.7	16.2
S	Calcitonin*	13	65.8	6.5	16.8	27.5
S	Calcium*	1.8	2.7	0.9	0.8	2.3
U	Calcium	26.2	27	13.1	9.4	31.0
S	Calcium (Ionized)	1.7	1.9	0.9	0.6	2.0
S	Carbohydrate Deficient Transferrin	7.1	38.7	3.6	9.8	15.7
S	Carcinoembryonic Antigen (CEA)*	6.8	59.3	3.4	14.9	20.5
S	Carnitine (Free)	8.05	16.65	4.0	4.6	11.3
S	Carnitine (Total)	8.85	11.8	4.4	3.7	11.0
P	Carotene	18	48	9.0	12.8	27.7
S	Carotene	36	39.7	18.0	13.4	43.1
B	CD4	25	–	12.5	–	–

Matrix	Analyte	Biological Variation		Desirable Specifications		
		CVw	CVb	Imp (%)	Bias (%)	TEa (%)p<0.05
S	Ceruloplasmin*	5	15.1	2.5	4.0	8.1
S	Chloride*	1.0	1.3	0.5	0.4	1.2
S	Cholesterol*	5.2	15.3	2.6	4.0	8.3
S	Cholinesterase	6.1	18.2	3.1	4.8	9.8
P	Chromogranin A*	14.8	30.6	7.4	8.5	20.7
P	Citrulline	21.4	43.9	10.7	12.2	29.9
S	CK-MB (Activity)	19.7	24.3	9.9	7.8	24.1
S	CK-MB (Mass)	18.4	56.6	9.2	14.9	30.1
B	CO ₂ *	4	4.8	2.0	1.6	4.9
S	CO ₂ *	4.2	4.4	2.1	1.5	5.0
P	Copper*	7.4	13.2	3.7	3.8	9.9
S	Copper*	7.4	13.2	3.7	3.8	9.9
S	Cortisol*	16.1	33.6	8.1	9.3	22.6
P	Cortisol*	16.1	33.6	8.1	9.3	22.6
S	C-Reactive Protein*	33.7	86.4	16.9	23.2	51.0
S	Creatine Kinase*	14.1	32.9	7.1	8.9	20.6
U	Creatinine	11	23	5.5	6.4	15.4
S	Creatinine*	4.4	16.2	2.2	4.2	7.8
S	CRP (High Sensitive)*	58.9	77.4	29.5	24.3	72.9
S	C-Telopeptide (CTX)	10.85	30.6	5.4	8.1	17.1
S	Cyfra 21.1	22.2	31.1	11.1	9.6	27.9
S	Cystatin C*	3.2	10.4	1.6	2.7	5.4
P	Cystatin C*	3.2	10.4	1.6	2.7	5.4
P	Cystine	38.3	48.5	19.2	15.4	47.0
P	D-dimer	23.3	26.5	11.7	8.8	28.0
S	Dehydroepiandrosterone Sulfate*	20	49	10.0	13.2	29.7
U	Deoxypyridinoline/Creatinine (24h)	15.35	30.3	7.7	8.5	21.2
S	Dihydrotestosterone*	11.5	37.1	5.8	9.7	19.2
P	Elastase	12.4	15.1	6.2	4.9	15.1
B	Eosinophils (Count)*	15	62.2	7.5	16.0	28.4
U	Epinephrine*	135	54	67.5	36.3	147.7
P	Epinephrine*	135	54	67.5	36.3	147.7
B	Erythrocytes (Count)*	2.8	7	1.4	1.9	4.2
U	Estradiol	30.4	–	15.2	–	–
U	Estradiol (Free)	38.6	–	19.3	–	–
S	Estradiol (Free)	22.8	–	11.4	–	–
S	Estradiol*	15	18.1	7.5	5.9	18.3
P	Factor V	3.6	–	1.8	–	–
P	Factor VII	6.8	19.4	3.4	5.1	10.7
P	Factor VIII	8.7	22.5	4.4	6.0	13.2
P	Factor X	5.35	–	2.7	–	–
P	Factor XII*	4	23.3	2.0	5.9	9.2
S	Ferritin	14.2	15	7.1	5.2	16.9
P	Fibrinogen	10.7	15.8	5.4	4.8	13.6

Matrix	Analyte	Biological Variation		Desirable Specifications		
		CVw	CVb	Imp (%)	Bias (%)	TEa (%)p<0.05
S	Fibroblast Growth Factor 23 (FGF-23)*	13.9	21.4	7.0	6.4	17.9
B	Folate	12	66	6.0	16.8	26.7
S	Folate*	10.9	23.7	5.5	6.5	15.5
S	Follicle Stimulating Hormone*	9.5	37.9	4.8	9.8	17.6
S	Free thyroxine (FT4)*	4.8	7.7	2.4	2.3	6.2
S	Free Triiodothyronine (FT3)*	4.9	8.3	2.5	2.4	6.5
S	Fructosamine*	2.3	6.3	1.2	1.7	3.6
S	Globulins, total	5.5	12.9	2.8	3.5	8.0
S	Glucose*	4.6	8.1	2.3	2.3	6.1
P	Glucose*	4.6	8.1	2.3	2.3	6.4
B	Glucose-6-Phosphate Dehydrogenase	32.8	31.8	16.4	11.4	38.5
P	Glutamic Acid	46.4	79.9	23.2	23.1	61.4
P	Glutamine	12.1	22	6.1	6.3	16.3
B	Glutathione Peroxidase	7.2	21.7	3.6	5.7	11.7
S	Glycated albumin*	1.4	5.7	0.7	1.5	2.6
P	Glycine*	17.4	13.7	8.7	5.5	19.9
S	HA (Hyaluronic Acid)	62	–	31.0	–	–
S	Haptoglobin*	8.6	39	4.3	10.0	17.1
P	Haptoglobin*	8.6	39	4.3	10.0	17.1
P	HDL Cholesterol*	5.7	20	2.9	5.2	9.9
S	HDL Cholesterol*	5.7	20	2.9	5.2	9.9
B	Hematocrit*	2.8	5.6	1.4	1.6	3.9
B	Hemoglobin A1C (IFCC)*	1.6	7.1	0.8	1.8	3.1
B	Hemoglobin A1C (JDS)	1.85	5.7	0.9	1.5	3.0
B	Hemoglobin A1C (Mono-S)	1.85	5.7	0.9	1.5	3.0
B	Hemoglobin A1C (NGSP)*	1.2	5.4	0.6	1.4	2.4
B	Hemoglobin A ₂	0.7	7.7	1.4	1.9	2.5
B	Hemoglobin*	2.7	6.2	1.4	1.7	3.9
P	Histidine	9.7	27.2	4.9	7.2	15.2
P	Homocysteine*	6.1	27.3	3.1	7.0	12.0
S	Human Epididymis Protein 4 (HE4)*	7.0	17.9	3.5	4.8	10.6
U	Hydroxyproline	36.1	38.8	18.1	13.2	43.0
P	Hydroxyproline, Total	34.5	56.7	17.3	16.6	45.1
S	Immunoglobulin A (IgA)*	7.5	32.5	3.8	8.3	14.5
S	Immunoglobulin G (IgG)*	3.4	17.1	1.7	4.4	7.2
S	Immunoglobulin M (IgM)*	5.9	48.5	3.0	12.2	17.1
S	Inhibin B	10	25	5.0	6.7	15.0
S	Insulin*	25.4	33.4	12.7	10.5	31.5
S	Insulin-like Growth Factor I (IGF-I, Somatomedin C)*	9.4	27	4.7	7.1	14.9
S	Interleukin 1-β	30	36	15.0	11.7	36.5
S	Interleukin-6 (IL-6)*	31.9	39.2	16.0	12.6	39.0
S	Interleukin-8	24	31	12.0	9.8	29.6
S	Iron*	27.6	26.7	13.8	9.6	32.4
P	Isoleucine	15.5	45.5	7.8	12.0	24.8

Matrix	Analyte	Biological Variation		Desirable Specifications		
		CVw	CVb	Imp (%)	Bias (%)	TEa (%)p<0.05
S	Kappa Free Light Chains*	5.9	14.6	3.0	3.9	8.8
S	k-Chains	4.8	15.3	2.4	4.0	8.0
B	Lactate	27.2	16.7	13.6	8.0	30.4
S	Lactate dehydrogenase (LDH)*	4.4	11.8	2.2	3.1	6.8
P	Lactoferrin	11.8	23.7	5.9	6.6	16.4
S	Lambda Free Light Chains*	5.6	21.9	2.8	5.7	10.3
S	l-Chains	4.8	18	2.4	4.7	8.6
S	LD1	2.3	8.3	1.2	2.2	4.1
S	LD2	3.3	2.4	1.7	1.0	3.7
S	LD3	2.8	3.8	1.4	1.2	3.5
S	LD4	5.9	5.3	3.0	2.0	6.9
S	LD5	8	9.6	4.0	3.1	9.7
S	LDL Cholesterol*	7.7	20.2	3.9	5.4	11.8
P	Leucine	14.8	44	7.4	11.6	23.8
B	Leukocytes (Count)*	11.1	17.2	5.6	5.1	14.3
S	Lipase*	7.6	25.2	3.8	6.6	12.9
S	Lipoprotein (a)*	10	85.8	5.0	21.6	29.9
S	Luteinizing Hormone*	25.2	21.4	12.6	8.3	29.1
B	Lymphocytes (Count)*	10.8	22.3	5.4	6.2	15.1
P	Lysine	11.5	38.2	5.8	10.0	19.5
S	Magnesium*	2.6	5.9	1.3	1.6	3.8
U	Magnesium	38.3	37.6	19.2	13.4	45.0
S	Magnesium (Ionized)	1.9	5.1	1.0	1.4	2.9
B	Mean Corpuscular Hemoglobin (MCH)*	0.7	4.6	0.4	1.2	1.7
B	Mean Corpuscular Hemoglobin Conc. (MCHC)*	0.9	1.4	0.5	0.4	1.2
B	Mean Corpuscular Volume (MCV)*	0.8	3.9	0.4	1.0	1.7
B	Mean Platelet Volume (MPV)*	2.2	7.0	1.1	1.8	3.7
P	Methionine	14.7	43.4	7.4	11.5	23.6
S	Methylmalonic Acid*	7.2	21.1	3.6	5.6	11.5
U	Microalbumin	35	35	17.5	12.4	41.2
B	Monocytes (Count)*	13.3	22.2	6.7	6.5	17.4
S	Mucinous Carcinoma-associated Antigen (MCA)	10.1	39.3	5.1	10.1	18.5
S	Myeloperoxidase (MPO)	36	30	18.0	11.7	41.4
S	Myoglobin	17.6	46.3	8.8	12.4	26.9
S	Neurofilament light (NF-L)*	8.6	25.2	4.3	6.7	13.8
B	Neutrophils (Count)*	14.1	24.3	7.1	7.0	18.7
B	Norepinephrine	9.5	–	4.8	–	–
P	Norepinephrine	19.5	–	9.8	–	–
S	NSE (Neuron-Specific Enolase)*	10.8	16.6	5.4	5.0	13.9
U	N-Telopeptide	15.5	37.6	7.8	10.2	23.0
S	NT-proBNP	10	16	5.0	4.7	13.0
P	Ornithine	18.4	54.9	9.2	14.5	29.7
S	Osmolality	1.3	1.2	0.7	0.4	1.5
P	Osmolality	1.3	1.5	0.7	0.5	1.6

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		CVw	CVb	Imp (%)	Bias (%)	TEa (%)p<0.05
U	Osmolality	28.3	57.9	14.2	16.1	39.5
S	Osteocalcin*	8.9	32.3	4.5	8.4	15.7
U	Oxalate	42.5	19.9	21.3	11.7	46.8
S	PAPP-A	12.6	14	6.3	4.7	15.1
S	Parathyroid hormone (PTH Intact)*	14.7	26	7.4	7.5	19.6
P	Parathyroid hormone (PTH Intact)*	14.7	26	7.4	7.5	19.6
B	pCO ₂	4.8	5.3	2.4	1.8	5.7
B	PCT (Plateletcrit)*	6.4	13.5	3.2	3.7	9.0
B	PDW*	3.8	12.3	1.9	3.2	6.4
B	PH	3.5	2	1.8	1.0	3.9
S	Phenylacetate	6.6	25.2	3.3	6.5	12.0
P	Phenylalanine	9.5	40.6	4.8	10.4	18.3
S	Phosphate*	7.7	10.7	3.9	3.3	9.7
U	Phosphate	18	22.6	9.0	7.2	22.1
S	Phospholipids	6.5	11.1	3.3	3.2	8.6
S	Phosphorylated Tau, 181 P*	16.7	25.7	8.4	7.7	21.4
S	PINP (Procollagen Type 1 N-terminal Propeptide)*	8.8	34.9	4.4	9.0	16.3
P	Plasminogen	7.7	–	3.9	–	–
B	Platelets*	7.3	16.3	3.7	4.5	10.5
B	P-LCR*	6.7	20.9	3.4	5.5	11.0
U	Porphobilinogen	17	31	8.5	8.8	22.9
U	Porphyrins (Total)	40	–	20.0	–	–
U	Potassium	24.4	22.2	12.2	8.2	28.4
S	Potassium*	3.9	5.3	2.0	1.6	4.9
S	Prealbumin*	10.9	19.1	5.5	5.5	14.5
S	Prolactin*	45	64.3	22.5	19.6	56.8
P	Prolactin*	45	64.3	22.5	19.6	56.8
P	Proline	17	104.4	8.5	26.4	40.5
S	Properdin Factor B	9.5	11.2	4.8	3.7	11.5
S	Prostatic Specific Antigen (PSA)*	6.8	42	3.4	10.6	16.2
U	Protein	35.5	23.7	17.8	10.7	40.0
S	Protein (Total)*	2.6	3.5	1.3	1.1	3.2
P	Protein C	5.8	55.2	2.9	13.9	18.7
P	Protein S	5.8	63.4	2.9	15.9	20.7
P	Prothrombin Time (ISI > 1.5)	4	6.8	2.0	2.0	5.3
P	Prothrombin Time (ISI < 1.4)	4	6.8	2.0	2.0	5.3
S	PSA (Free)*	7.1	46.2	3.6	11.7	17.5
S	PSA, Complexed (cPSA)*	8.8	57.7	4.4	14.6	21.9
U	Pyridinoline/Creatinine	19.4	23.6	9.7	7.6	23.6
B	Pyruvate	15.2	13	7.6	5.0	17.5
B	RDW-SD*	1.6	4.2	0.8	1.1	2.4
B	Red Cell Distribution Wide (RDW)	3.5	5.7	1.8	1.7	4.6
S	Renin (Direct Measure)*	30.1	41.6	15.1	12.8	37.7
B	Retic-HE*	1.7	3.4	0.9	1.0	2.4

Matrix	Analyte	Biological Variation		Desirable Specifications		
		CVw	CVb	Imp (%)	Bias (%)	TEa (%)p<0.05
B	Reticulocyte (Count)*	9.7	27.1	4.9	7.2	15.2
P	Retinol*	6	21	3.0	5.5	10.4
S	Retinol*	6	21	3.0	5.5	10.4
S	Rheumatoid Factor	8.5	24.5	4.3	6.5	13.5
S	S100 (Calcium Binding Protein)*	10.2	32.7	5.1	8.6	17.0
S	SCC	39.4	35.7	19.7	13.3	45.8
B	Selenium	12	12	6.0	4.2	14.1
P	Selenium*	7.7	11.3	3.9	3.4	9.8
P	Serine	12.8	42.8	6.4	11.2	21.7
S	Sex Hormone Binding Globulin (SHBG)*	8.9	46.9	4.5	11.9	19.3
U	Sodium	28.7	16.7	14.4	8.3	32.0
S	Sodium*	0.5	0.7	0.3	0.2	0.6
S	Soluble Transferrin Receptor (sTfR)*	6.9	19.1	3.5	5.1	10.8
S	ST2 (IL1R1, Soluble)*	10.5	41.4	5.3	10.7	19.3
S	T3 (Free)*	5.1	8.1	2.6	2.4	6.6
P	T3 (Total)*	6.2	11.1	3.1	3.2	8.3
P	T4 (Free)*	4.8	8	2.4	2.3	6.3
S	Tartrate-resistant Acid Phosphatase (5b)*	10.8	13.3	5.4	4.3	13.2
P	Taurine	30.6	44	15.3	13.4	38.6
U	Testosterone	25	–	12.5	–	–
U	Testosterone (Free)	51.7	–	25.9	–	–
S	Testosterone (Free)*	55	68	27.5	21.9	67.2
S	Testosterone*	14.5	23.1	7.3	6.8	18.8
P	Testosterone*	14.5	23.1	7.3	6.8	18.8
P	Threonine	17.9	33.1	9.0	9.4	24.2
S	Thyroglobulin antibody	8.5	82	4.3	20.6	27.6
S	Thyroglobulin*	10.9	79.8	5.5	20.1	29.1
S	Thyroid peroxidase antibody	11.3	147	5.7	36.9	46.2
S	Thyroid Stimulating Hormone (TSH)*	17.9	36.1	9.0	10.1	24.8
S	Thyrotropin Receptor Antibody	4.8	–	2.4	–	–
S	Thyroxin Binding Globulin (TBG)	0.09	0.06	0.0	0.0	0.1
S	Thyroxine (T4)*	6.4	12	3.2	3.4	8.7
S	Tissue Plasminogen Activator Ag (tPA Ag)*	27.1	62.4	13.6	17.0	39.4
S	Tissue Polypeptide Antigen (TPA)	31.1	63.7	15.6	17.7	43.4
S	Tissue polypeptide specific antigen (TPS)	36.1	108	18.1	28.5	58.3
U	Total Catecholamines (Concentration) 24 h	24	32	12.0	10.0	29.8
S	Transferrin*	3.8	13.9	1.9	3.6	6.7
S	Triglyceride*	19.7	33.1	9.9	9.6	25.9
S	Triiodothyronine (T3)*	9.4	12.2	4.7	3.9	11.6
P	Troponin I	37.1	179.2	18.6	45.8	76.4
S	Troponin I	14.05	63.75	7.0	16.3	27.9
S	Troponin T	30.5	89.95	15.3	23.7	48.9
S	Tryptase*	5.6	31.5	2.8	8.0	12.6
P	Tryptophan	22.7	152.6	11.4	38.6	57.3

Matrix	Analyte	Biological Variation		Desirable Specifications		
		CVw	CVb	Imp (%)	Bias (%)	TEa (%)p<0.05
P	TSH*	17.6	35.9	8.8	10.0	24.5
S	Tumor Necrosis Factor*	18.3	26.6	9.2	8.1	23.2
P	Tyrosine*	16.1	24.8	8.1	7.4	20.7
S	Urate*	8.1	22.4	4.1	6.0	12.6
U	Urate	16.8	14.4	8.4	5.5	19.4
U	Urea Concentration	17.4	25.4	8.7	7.7	22.1
S	Urea*	13.3	20.6	6.7	6.1	17.1
P	Valine	10.6	40.1	5.3	10.4	19.1
P	Vitamin B1	4.8	12	2.4	3.2	7.2
S	Vitamin B ₁₂ *	7.2	37	3.6	9.4	15.4
B	Vitamin B ₁₂	15	69	7.5	17.7	30.0
B	Vitamin B2	5.8	10	2.9	2.9	7.7
B	Vitamin B6	14	24	7.0	6.9	18.5
P	Vitamin B6	20	34	10.0	9.9	26.4
P	Vitamin E (α-Tocopherol)*	7.0	17.3	3.5	4.7	10.4
S	VLDL Cholesterol	27.6	–	13.8	–	–
U	VMA	22.2	47	11.1	13.0	31.3
P	Von Willebrand Factor	2.5	27.3	1.25	6.9	8.9
P	Zinc*	8.5	8.8	4.3	3.1	10.1
S	Zinc*	8.5	8.8	4.3	3.1	10.1

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