

Updated for 2012! Desirable Specifications for imprecision, inaccuracy, and total allowable error, calculated from data on within-subject and between-subject biologic variation. This database is updated and compiled by Dr. Carmen Ricos and colleagues. We are honored to be able to host this database.

Desirable Specifications for Total Error, Imprecision, and Bias, derived from intra- and inter-individual biologic variation

This most recent and extensive listing of biologic goals has been provided by Ricos C, Alvarez V, Cava F, Garcia-Lario JV, Hernandez A, Jimenez CV, Minchinela J, Perich C, Simon M. "Current databases on biologic variation: pros, cons and progress." Scand J Clin Lab Invest 1999;59:491-500. [This database was most recently updated in 2012.](#)

Annex I, Part I: Within-subject and between-subject CV values of analytes and *Desirable Analytical Quality Specifications for imprecision, bias and total error*

- [11-Desoxycortisol through a-Fetoprotein](#)
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Note on abbreviations:

- CVw = within-subject biologic variation
- CVg = between-subject biologic variation
- I = desirable specification for imprecision
- B = desirable specification for inaccuracy
- TE = desirable specification for allowable total error

	Analyte	Biological Variation				Desirable specification		
		CVw	CVg	I (%)	B (%)	TE (%)		

S-	11-Desoxycortisol	21.3	31.5	10.7	9.5	27.1
S-	17-Hydroxyprogesterone	19.6	50.4	9.8	13.5	29.7
U-	4-hydroxy-3-methoximandelate (VMA)	22.2	47.0	11.1	13.0	31.3
S-	5' Nucleotidase	23.2	19.9	11.6	7.6	26.8
U-	5'-Hydroxyindolacetate, concentration	20.3	33.2	10.2	9.7	26.5
S-	α 1-Acid Glycoprotein	11.3	24.9	5.7	6.8	16.2
S-	α 1-Antichymotrypsin	13.5	18.3	6.8	5.7	16.8
S-	α 1-Antitrypsin	5.9	16.3	3.0	4.3	9.2
S-	α 1-Globulins	11.4	22.6	5.7	6.3	15.7
U-	α 1-Microglobulin, concentration, first morning	33.0	58.0	16.5	16.7	43.9
P-	α 2-Antiplasmin	6.2	---	3.1	---	---
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 2-Microglobulin output, first morning	29.0	32.0	14.5	10.8	34.7
P-	α -aminobutyric acid	24.7	32.3	12.4	10.2	30.5
S-	α -Amylase	8.7	28.3	4.4	7.4	14.6
S-	α -Amylase (pancreatic)	11.7	29.9	5.9	8.0	17.7
U-	α -Amylase (pancreatic)	39.0	78.4	19.5	21.9	54.1
U-	α -Amylase concentration, random	94.0	46.0	47.0	26.2	103.7
P-	α -Carotene	24.0	65.0	12.0	17.3	37.1
S-	α -Carotene	48.0	65.0	24.0	20.2	59.8
S-	α -Fetoprotein(non hepatic carcinoma)	12.2	45.6	6.1	11.8	21.9
S-	α -Tocopherol	13.8	15.0	6.9	5.1	16.5
S-	Acid phosphatase	8.9	8.0	4.5	3.0	10.3
S-	Acid phosphatase tartrate-resistant (TR-ACP)	8.0	13.3	4.0	3.9	10.5
S-	Acid phosphatase prostatic activity (PAP)	33.8	---	16.9	---	---
P-	Activated partial thromboplastine time	2.7	8.6	1.4	2.3	4.5
S-	Acyl/free carnitine	10.4	27.2	5.2	7.3	15.9
P-	Adiponectin	18.8	51.2	9.4	13.6	29.1
S-	Adenosine deaminase (ADA)	11.7	25.5	5.9	7.0	16.7
P-	Alanine	14.7	55.8	7.4	14.4	26.6
S-	Alanine aminopeptidase	4.1	---	2.1	---	---
S-	Alanine aminotransferase	18.0	42.0	9.0	11.4	26.3

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Analyte	Biological	Desirable
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		Variation				specification	
		CVw	CVg	I (%)	B (%)	TE (%)	
S-	Albumin	3.1	4.2		1.6		1.3
U-	Albumin, concentration, first morning	36.0	55.0		18.0		16.4
U-	Albumin, output, night urine	29.5	58.0		14.8		16.3
S-	Albumin, glycated	5.2	10.3		2.6		2.9
U-	Albumin/creatinine	30.5	32.5		15.3		11.1
S-	Aldosterone	29.4	40.1		14.7		12.4
U-	Aldosterone, concentration	32.6	39.0		16.3		12.7
S-	Alkaline phosphatase	6.4	24.8		3.2		6.4
S-	Alkaline phosphatase, bone	6.2	37.4	3.1	9.5	14.6	
S-	Alkaline phosphatase, liver	10.0	27.0		5.0		7.2
S-	Alkaline phosphatase, placental	19.1	---		9.6		---
U-	Ammonia, output, 24h	24.7	27.3		12.4		9.2
S-	Amyloid A	25.0	61.0		12.5		16.5
S-	Androstendione	11.1	51.1		5.8		13.1
P-	Angiotensin converting enzyme	0.1	---		0.1		---
S-	Anion gap	9.5	10.1		4.8		3.5
P-	Antithrombin III	5.2	15.3		2.6		4.0
S-	Apolipoprotein A1	6.5	13.4		3.3		3.7
S-	Apolipoprotein B	6.9	22.8		3.5		6.0
P-	Arginine	19.3	34.1		9.7		9.8
S-	Arilestearase activity, non inhibited	3.8	37.2		1.9		9.3
P-	Ascorbate (Vitamin C)	20.0	21.0		10.0		7.3
S-	Ascorbate (Vitamin C)	26.0	31.0		13.0		10.1
P-	Asparagine	12.3	28.0		6.2		7.6
S-	Aspartate aminotransferase	11.9	17.9		6.0		5.4
P-	Aspartic acid	31.2	55.1		15.6		15.8
S-	β -2-Microglobulin	5.9	15.5		3.0		4.1
P-	β -Carotene	18.0	48.0		9.0		12.8
S-	β -Carotene	36.0	39.7		18.0		13.4
S-	β -Cryptoxantin	36.7	---		18.4		---
S-	β -Globulins	10.1	9.1		5.1		3.4
B-	Base excess	76.4	43.2		38.2		21.9
S-	Basophile, count	28.0	54.8		14.0		15.4
S-	Bilirubin total	23.8	39.0		11.9		11.4
S-	Bilirubin conjugated	36.8	43.2		18.4		14.2
Patien t-	Body mass	1.1	26.6		0.6		6.7
P-	C Protein	5.6	55.2		2.9		13.9
S-	C reactive protein	42.2	76.3		21.1		21.8
S-	C3 Complement	5.2	15.6		2.6		4.1

S-	C4 Complement	8.9	33.4	4.5	8.6
S-	CA 125 antigen	24.7	54.6	12.4	15.0
S-	CA 15.3 antigen	6.1	62.9	3.1	15.8
S-	CA 19.9 antigen	16.0	102.0	8.0	25.8
S-	CA 549 antigen	9.1	33.4	4.6	8.7

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	Analyte	Biological Variation				Desirable specification	
		CVw	CVg	I (%)	B (%)	TE (%)	
S-	Calcium	1.9	2.8		1.0		0.8
S-	Calcium, complexed	5.3	4.5		2.7		1.7
U-	Calcium, concentration, 24h	27.5	36.6		13.8		11.4
U-	Calcium, ionized	1.7	1.9		0.9		0.6
U-	Calcium, output, 24h	26.2	27.0		13.1		9.4
S-	Calcium, protein bound	4.1	6.1		2.1		1.8
S-	Calcium, ultrafiltrable	2.2	2.7		1.1		0.9
S-	Carbohydrate deficient transferrin	7.1	38.7		3.6		9.8
(B) Gas	Carbon dioxide	4.8	5.3		2.4		1.8
S-	Carcinoembryonic antigen (CEA)	12.7	55.6		6.4		14.3
S-	Carnitine, free	7.6	15.2		3.8		4.2
S-	Carnitine, total	7.7	13.8		3.9		4.0
S-	Ceruloplasmin (ferroxidase)	5.8	11.1		2.9		3.1
S-	Chloride	1.2	1.5		0.6		0.5
S-	Cholesterol	5.4	15.2		2.7		4.0
S-	Cholinesterase, concentration	7.1	---		3.6		---
S-	Cholinesterase, activity	6.1	18.2		3.1		4.8
P-	Chromogranin A	12.8	26.3		6.4		7.3
P-	Citrulline	21.4	43.9		10.7		12.2
S-	Collagen type I C propeptide (PICP)	7.8	26.7		3.9		7.0
S-	Collagen type I N propeptide (PINP)	7.4	57.3		3.7		14.4
S-	Collagen type III N propeptide (PIIINP)	13.6	87.2		6.8		22.1
U-	Color, first morning	30.9	47.4		15.5		14.1
P-	Copper	8.0	19.0		4.0		5.2
S-	Copper	4.9	13.6		2.5		3.6
S-	Cortisol	20.9	45.6		10.5		12.5
S-	C Peptide	16.6	23.2		8.3		7.1
S-	C-Propeptide type I procollagen	8.2	17.6		4.1		4.9
S-	C-Reactive protein	42.2	76.3		21.1		21.8
S-	Creatine kinase (CK)	22.8	40.0		11.4		11.5

S-	Creatine kinase MB, %	6.9	48.2	3.5	10.8
S-	Creatine kinase MB, activity	19.7	24.3	9.9	7.8
S-	Creatine kinase MB, mass	18.4	61.2	9.2	16.0
S-	Creatinine	6.0	14.7	3.0	4.0
Patient-	Creatinine clearance	13.6	13.5	6.8	4.8
Patient-	Creatinine clearance, MDRD	6.7	---	3.4	---
U-	Creatinine, concentration, 24h	24.0	24.5	12.0	8.6
U-	Creatinine, concentration, first morning	23.2	25.7	11.6	8.7
U-	Creatinine, concentration, random	36.3	32.4	18.2	12.2
U-	Creatinine, output, 24h	11.0	23.0	5.5	6.4
S-	C-Terminal telopeptide type I collagen	9.6	30.6	4.8	8.0
U-	C-Terminal telopeptide type I collagen/creatinine, second void	24.4	48.0	12.2	13.5
S-	Cyfra 21.1	22.2	31.1	11.1	9.6
P-	Cystatin C	5.5	---	2.8	---
S-	Cystatin C	4.6	13.0	2.3	3.4
P-	Cysteine	5.9	12.3	3.0	3.4
P-	Cystine	38.3	48.5	19.2	15.4
U-	δ -aminolevulinic acid	16.0	27.0	8.0	7.8

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	Analyte	Biological Variation				Desirable specification	
		CVw	CVg	I (%)	B (%)	TE (%)	
S-	Dehydroepiandrosterone sulfate	5.6	25.9		2.8		6.6
U-	Deoxypyridinoline/creatinine, 24h	16.0	30.7		8.0		8.7
U-	Deoxypyridinoline/creatinine, first morning	13.8	34.6		6.9		9.3
U-	Deoxypyridinoline/minute, first morning	15.4	30.3		7.7		8.5
P-	Dipeptidyl-peptidase IV (ACE)	8.2	14.5		4.1		4.2
S-	Dipeptidyl-peptidase IV (ACE)	12.5	27.7		6.3		7.6
P-	Elastase	13.6	16.4		6.8		5.3
S-	Endothelial growth factor	10.7	47.6		5.4		12.2
B-	Eosinophils, count	21.0	76.4		10.5		19.8
(B)Patient-	Epinephrine	25.3	---		12.7		---
P-	Epinephrine	48.3	---		24.2		---

B-	Erythrocytes, count	3.2	6.1	1.6	1.7
B-	Erythrocyte distribution wide	3.5	5.7	1.8	1.7
U-	Estradiol	30.4	---	15.2	---
S-	Estradiol	22.8	24.4	11.4	8.3
U-	Estradiol, free	38.6	---	19.3	---
P-	Factor V coagulation	3.6	---	1.8	---
P-	Factor VII coagulation	6.8	19.4	3.4	5.1
P-	Factor VIII coagulation	4.8	19.1	2.4	4.9
P-	Factor X coagulation	5.9	---	3.0	---
S-	Ferritin	14.2	15.0	7.1	5.2
P-	Fibrinogen	10.7	15.8	5.4	4.8
(B)Ert hry-	Folate	12.0	66.0	6.0	16.8
S-	Folate	24.0	73.0	12.0	19.2
S-	Follicle stimulating hormone (FSH)	7.9	41.6	3.9	10.6
S-	Fructosamine	3.4	5.9	1.7	1.7
S-	Galactosyl hydroxylysine	11.8	25.8	5.9	7.1
S-	γ-Globulins	14.6	12.3	7.3	4.8
S-	γ-glutamyltransferase	13.8	41.0	6.9	10.8
S-	Globulins, total	5.5	12.9	2.8	3.5
P-	Glucose	4.5	5.8	2.3	1.8
S-	Glucose	6.1	6.1	2.9	2.2
(B)Ery thr-	Glucose-6-phosphate-1-dehydrogen ase (G6PDH)	32.8	31.8	16.4	11.4
B - spot	Glucose-6-phosphate-1-dehydrogen ase (G6PDH)	7.3	10.3	3.7	3.2
P-	Glutamic acid	46.4	79.9	23.2	23.1
P-	Glutamine	12.1	22.0	6.1	6.3
S-	Glutathion peroxidase	7.2	21.7	3.6	5.7
P-	Glycine	11.8	40.3	5.9	10.5
P-	Haptoglobin	20.0	27.9	10.0	8.6
S-	Haptoglobin	20.4	36.4	10.2	10.4
S-	HDL cholesterol	7.1	19.7	3.6	5.2
S-	HDL 1 cholesterol	5.5	27.2	2.8	6.9
S-	HDL 2 cholesterol	15.7	40.7	7.9	10.9
S-	HDL 3 cholesterol	7.0	14.3	3.5	4.0
B-	Hematocrit	2.8	6.4	1.4	1.7
B-	Hemoglobin	2.8	6.6	1.4	1.8
B-	Hemoglobin A1 C	1.9	5.7	0.9	1.5
P-	Histidine	9.7	27.2	4.9	7.2
P-	Homocysteine	9.0	40.3	4.5	10.3
S-	Hydroxybutyrate dehydrogenase	6.6	---	3.3	---
P-	Hydroxyproline	34.5	56.7	17.3	16.6

U-	Hydroxyproline/creatinine, first morning	34.3	42.7	17.2	13.7
U-	Hydroxyproline/creatinine, second void	19.0	33.8	9.5	9.7
U-	Hydroxyproline/minute, first morning	36.1	38.8	18.1	13.2
U-	Hydroxyproline/minute, second void	40.5	32.9	20.3	13.0

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	Analyte	Biological Variation				Desirable specification	
		CVw	CVg	I (%)	B (%)	TE	
S-	Immunoglobulin A	5.4	35.9	2.7	9.1	13.5	
S-	Immunoglobulin G	4.5	16.5	2.3	4.3	8.0	
S-	Immunoglobulin M	5.9	47.3	3.0	11.9	16.8	
S-	Immunoglobulin κ chains	4.8	15.3	2.4	4.0	8.0	
S-	Immunoglobulin λ chains	4.8	18.0	2.4	4.7	8.6	
S-	Insulin	21.1	58.3	10.6	15.5	32.9	
S-	Insulin-like growth factor (IGF-1)	14.6	45.4	7.3	11.9	24.0	
S-	Insulin-like growth factor binding protein 3 (IGFBP-3)	10.1	63.9	5.1	16.2	24.5	
S-	Intercellular adhesion molecule-1 (ICAM-1)	1.9	21.0	1.0	5.3	6.8	
(B) Leuc-	Interferon	14.0	20.0	7.0	6.1	17.7	

	receptor					
S-	Interleukin 1- β	30.0	36.0	15.0	11.7	36.5
S-	Interleukin-8	24.0	31.0	12.0	9.8	29.6
S-	Iron	26.5	23.2	13.3	8.8	30.7
P-	Isoleucine	15.5	45.5	7.8	12.0	24.8
B-	Lactate	27.2	16.7	13.6	8.0	30.4
S-	Lactate dehydrogenase (LDH)	8.6	14.7	4.3	4.3	11.4
S-	Lactate dehydrogenase 1 isoform (LDH1)	2.3	8.3	1.2	2.2	4.1
S-	Lactate dehydrogenase 2 isoform (LDH2)	3.3	2.4	1.7	1.0	3.7
S-	Lactate dehydrogenase 3 isoform (LDH3)	2.8	3.8	1.4	1.2	3.5
S-	Lactate dehydrogenase 4 isoform (LDH4)	5.9	5.3	3.0	2.0	6.9
S-	Lactate dehydrogenase 5 isoform (LDH5)	8.0	9.6	4.0	3.1	9.7
P-	Lactoferrin	11.8	23.7	5.9	6.6	16.4
S-	LDL Cholesterol	8.3	25.7	4.2	6.8	13.6
S-	LDL Cholesterol	6.5	---	3.3	---	---

	(direct)					
P-	LDL Cholesterol (oxidized)	21.0	50.0	10.5	13.6	30.9
S-	LDL receptor mRNA	21.5	13.6	10.8	6.4	24.1
P-	Leucine	14.8	44.0	7.4	11.6	23.8
B-	Leukocytes count	10.9	19.6	5.5	5.6	14.6
S-	Lipase	23.1	33.1	11.6	10.1	29.1
S-	Lipoprotein (a)	20.8	18.1	10.4	6.9	24.1
P-	Lutein	13.0	21.0	6.5	6.2	16.9
S-	Lutein	23.7	---	11.9	---	---
S-	Luteinizing hormone (LH)	14.5	27.8	7.3	7.8	19.8
P-	Lycopene	22.0	33.0	11.0	9.9	28.1
S-	Lycopene	40.1	33.0	20.1	13.0	---
B-	Lymphocytes, count	10.4	27.8	5.2	7.4	16.0
B-	Lymphocytes CD4	25.0	---	12.5	---	---
P-	Lysine	11.5	38.2	5.8	10.0	19.5

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	Analyte	Biological Variation				Desirable specification	
		CVw	CVg	I (%)	B (%)	TE (%)	
(B) Erythr-	Magnesium	5.6		11.3		2.8	3.2
(B) Leuc-	Magnesium	18.3		16.4		9.2	6.1
(B) Mon -	Magnesium	18.1		20.3		9.1	6.8
S-	Magnesium	3.6		6.4		1.8	1.8
U-	Magnesium, concentration, 24h	45.4		37.4		22.7	14.7
U-	Magnesium, ionized	1.9		5.1		1.0	1.4
U-	Magnesium, output, 24h	38.3		37.6		19.2	13.4
(B) Erythr-	Mean corpuscular hemoglobin (HCM)	1.6		5.2		0.8	1.4

(B)Eryth r-	Mean corpuscular hemoglobin concentration (MCHC)	1.7	2.8	0.9	0.8
(B)Eryth r-	Mean corpuscular volume (MCV)	1.3	4.8	0.7	1.2
(B)Plat-	Mean platelet volume (MPV)	4.3	8.1	2.2	2.3
P-	Metionine	14.7	43.4	7.4	11.5
B-	Monocytes, count	17.8	49.8	8.9	13.2
S-	Mucinous carcinoma-associated antigen (MCA)	10.1	39.3	5.1	10.1
S-	Myeloperoxidase	36.0	30.0	18.0	11.7
S-	Myoglobin	13.9	29.6	7.0	8.2
U-	N-Acetyl Glucosaminidase, concentration, first morning	52.9	22.0	26.5	14.3
U-	N-Acetyl Glucosaminidase/Creatinine	51.1	21.8	25.6	13.9
B-	Neutrophyles, count	16.1	32.8	8.1	9.1
U-	Nitrogen, output	13.9	24.2	7.0	7.0
S-	Non-inhibited arilestearase activity	3.8	37.2	1.9	9.3
B(Plat)-	Norepinephrine	9.5	---	4.8	---
P-	Norepinephrine	19.5	---	9.8	---
U-	N-Telopeptide type I collagen/Creatinine, first morning	17.0	52.0	8.5	13.7
U-	N-Telopeptide type I collagen/Creatinine, second void	15.5	37.6	7.8	10.2
S-	N-terminal (NT)-proBNP	10.0	16.0	5.0	4.7
P-	Ornithine	18.4	54.9	9.2	14.5
P-	Osmolality	1.3	1.5	0.7	0.5
Saliva-	Osmolality	9.5	35.8	4.8	9.3
S-	Osmolality	1.3	1.2	0.7	0.4
U-	Osmolality, first morning	28.3	57.9	14.2	16.1
S-	Osteocalcin	6.3	23.1	3.2	6.0
S-	Osteocalcin (+1 trab)	7.2	27.0	3.6	7.0
U-	Oxalate, concentration, 24h	44.0	18.0	22.0	11.9
U-	Oxalate, output, 24h	42.5	19.9	21.3	11.7

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	Analyte	Biological Variation				Desirable specification	
		CVw	CVg	I (%)	B (%)	TE (%)	
B-	pCO2	4.8	5.3		2.4		1.8
B-	pH [H+]	3.5	2.0		1.8		1.0

B-	pH (pH units)	0.2	---	0.1	---
S-	Paraoxonase 1	13.4	84.0	6.7	21.3
S-	Paraoxonase 1 substrate inhibition (PON 4SI)	3.9	80.1	1.9	20.0
S-	Paraoxonase, activity (salt stimulated)	8.0	86.4	4.0	21.7
S-	Parathyroid hormone (PTH)	25.9	23.8	13.0	8.8
S-	Phenylacetate	6.6	25.2	3.3	6.5
P-	Phenylalanine	9.5	40.6	4.8	10.4
S-	Phosphate	8.5	9.4	4.3	3.2
U-	Phosphate, concentration, 24h	26.4	26.5	13.2	9.4
U-	Phosphate, output, 24h	18.0	22.6	9.0	7.2
Patient-	Phosphate tubular reabsorption	2.7	3.3	1.4	1.1
S-	Phospholipids	6.5	11.1	3.3	3.2
B-	Piruvate	15.2	13.0	7.6	5.0
P-	Plasminogen	7.7	---	3.9	---
B-	Platelets, count	9.1	21.9	4.6	5.9
B-	Platelet distribution wide	2.8	---	1.4	---
B-	Plateletcrit	11.9	---	6.0	---
U-	Porphobilinogen	17.0	31.0	8.5	8.8
U-	Porphyrins (total)	40.0	---	20.0	---
(B)Leuc-	Potassium	13.6	13.4	6.8	4.8
S-	Potassium	4.8	5.6	2.4	1.8
U-	Potassium, concentration, 24h	27.1	23.2	13.6	8.9
U-	Potassium, output	24.4	22.2	12.2	8.2
S-	Prealbumin	10.9	19.1	5.5	5.5
S-	Prolactin	23.0	35.0	11.5	10.5
P-	Proline	17.0	104.4	8.5	26.4
P-	Prolyl endopeptidase	16.8	13.9	8.4	5.5
S-	Properdin factor B	9.5	11.2	4.7	3.7
S-	Prostatic specific antigen (PSA)	18.1	72.4	9.1	18.7
S-	Protein	2.7	4.0	1.4	1.2
U-	Protein, concentration, 24h	39.6	17.8	19.8	10.9
S-	Protein, glycated	0.9	11.6	0.5	2.9
U-	Protein, output, 24h	35.5	23.7	17.8	10.7
S-	Protein, total	2.7	4.0	1.4	1.2
S-	Protein, total, glycated	0.9	11.6	0.5	2.9
P-	Prothrombin time	4.0	6.8	2.0	2.0
U-	Pyridinoline/creatinine	8.7	17.6	4.4	4.9
U-	Pyridinoline/minute, first morning	19.4	23.6	9.7	7.6
B-	Pyruvate	15.2	13.0	7.6	5.0

B-	Red cell distribution wide (RDW)	3.5	5.7	1.8	1.7
S-	Reticulocyte highly fluorescent, count	10.0	62.0	5.0	15.7
S-	Reticulocyte low fluorescent, count	1.6	4.9	0.8	1.3
S-	Reticulocyte medium fluorescent, count	13.0	33.0	6.5	8.9
S-	Reticulocyte, count	11.0	29.0	5.5	7.8
P-	Retinol	6.2	21.0	3.1	5.5
S-	Retinol	13.6	19.0	6.8	5.8
S-	Rheumatoid factor	8.5	24.5	4.3	6.5

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	Analyte	Biological Variation			Desirable specification	
		CVw	CVg	I (%)	B (%)	TE (%)
S-	SCC antigen	39.4	35.7	19.7	13.3	
P-	S Protein	5.8	63.4	2.9	15.9	
P-	Selenium	12.0	14.0	6.0	4.6	
B-	Selenium	12.0	12.0	6.0	4.2	
P-	Serine	12.8	42.8	6.4	11.2	
S-	Sex hormone binding globulin (SHBG)	12.1	42.7	6.1	11.1	
(B) Ery thr-	Sodium	1.8	12.4	0.9	3.1	
(B) Leu c-	Sodium	51.0	36.4	25.5	15.7	
S-	Sodium	0.7	1.0	0.4	0.3	
B-	Sodium Bicarbonate	4.0	4.8	2.0	1.6	
S-	Sodium Bicarbonate	4.8	4.7	2.4	1.7	
Sweat-	Sodium Chloride	15.0	25.0	7.5	7.3	
U-	Sodium, concentration, 24 h.	24.0	26.8	12.0	9.0	
U-	Sodium output, 24 h.	28.7	16.7	14.4	8.3	
P-	Soluble CD163	9.0	35.9	4.5	9.3	
Semen-	Spermatozoa, concentration	26.8	56.4	13.4	15.6	
Semen-	Spermatozoa, morphology	19.6	44.0	9.8	12.0	
Semen-	Spermatozoa, progressive motility	15.2	32.8	7.6	9.0	
Semen-	Spermatozoa, fast progressive motility	18.8	51.8	9.4	13.8	
Semen-	Spermatozoa, total motility	18.4	29.8	9.2	8.8	
Semen-	Spermatozoa, vitality	10.3	25.8	5.2	6.9	
S-	Superoxide dismutase	17.1	10.5	8.6	5.0	
(B) Ery	Superoxide dismutase	12.3	4.9	6.2	3.3	

thr-					
P-	Taurine	30.6	44.0	15.3	13.4
S-	Testosterone	9.3	19.7	4.7	5.4
Saliva -	Testosterone	17.3	28.8	8.7	8.4
U-	Testosterone	25.0	---	12.5	---
S-	Testosterone, free	9.3	---	4.7	---
U-	Testosterone, free	51.7	---	25.9	---
S-	Thyroglobulin	14.0	39.0	7.0	10.4
S-	Thyroglobulin antibody	8.5	82.0	4.3	20.6
S-	Thyroid peroxidase antibody	11.3	147.0	5.7	36.9
S-	Thyroid stimulating hormone (TSH)	19.3	24.6	9.7	7.8
S-	Thyrotropin receptor antibody	4.8	---	2.4	---
S-	Thyroxine (T4)	4.9	10.9	2.5	3.0
S-	Thyroxine, free (FT4)	5.7	12.1	2.9	3.3
S-	Thyroxine/TBG	0.1	0.1	0.0	0.0
S-	Thyroxine binding globulin (TBG)	0.09	0.06	0.0	0.0
P-	Tirosine	10.5	61.0	5.3	15.5
S-	Tissue polypeptide antigen (TPA)	31.1	63.7	15.6	17.7
S-	Tissue polypeptide specific antigen (TPS)	36.1	108.0	18.1	28.5
S-	Total carnitine	7.7	13.8	3.9	4.0
U-	Total catecolamines, concentration, 24h	24.0	32.0	12.0	10.0
S-	Transferrin	3.0	4.3	1.5	1.3
P-	Treonine	17.9	33.1	9.0	9.4
S-	Triglyceride	20.9	37.2	10.5	10.7
S-	Triiodothyronine (T3)	8.7	17.2	4.4	4.8
S-	Triiodothyronine/TBG	0.1	0.1	0.1	0.0
S-	Triiodothyronine, free (FT3)	7.9	17.6	4.0	4.8
S-	Triiodothyronine, uptake	0.05	---	0.03	---
S-	Troponin I	9.7	57.0	4.9	14.5
S-	Troponin T	30.5	90.0	15.3	23.7
P-	Tryptophan	22.7	152.6	11.4	38.6
S-	Tumor Necrosis Factor-a (TNF-a)	43.0	29.0	21.5	13.0
S-	Urate	9.0	17.6	4.5	4.9
U-	Urate, concentration, 24h	24.7	22.1	12.4	8.3
U-	Urate, output, 24h	18.5	14.4	9.3	5.9
S-	Urea	12.3	18.3	6.2	5.5
U-	Urea, concentration, 24h	22.7	25.9	11.4	8.6
U-	Urea, output, 24h	17.4	25.4	8.7	7.7
P-	Valine	10.6	40.1	5.3	10.4

U-	Vanilmandelic Acid concentration, 24h	22.2	47.0	11.1	13.0
S-	Vascular cell adhesion molecule-1 (VCAM-1)	5.2	16.0	2.6	4.2
P-	Vascular endotelial growth factor	14.1	18.1	7.1	5.7
B-	Vascular endotelial growth factor	14.3	28.8	7.2	8.0
S-	Vascular endotelial growth factor	10.7	47.6	5.4	12.2
P-	Vitamin B1	4.8	12.0	2.4	3.2
B-	Vitamin B2 (Riboflavin)	5.8	10.0	2.9	2.9
(B)Ery th-	Vitamin B2 (Riboflavin)	6.4	11.0	3.2	3.2
(B)Ery th-	Vitamin B2 status (gluthation reductase activation)	5.2	40.0	2.6	10.1
(B)Ery th-	Vitamin B12	15.0	69.0	7.5	17.7
(B)Ery th-	Vitamin B6	14.0	24.0	7.0	6.9
B-	Vitamin B6	20.0	34.0	10.0	9.9
(B)Ery th-	Vitamin B6 status (AST activation)	1.4	44.0	0.7	11.0
(B)Ery th-	Vitamin E (Tocopherol)	7.6	21.0	3.8	5.6
(B)Ery th-	Vitamin K (Phylloquinone)	38.0	44.0	19.0	14.5
S-	VLDL Cholesterol	27.6	---	13.8	---
P-	Von Willebrand factor	2.5	27.3	1.3	6.9
P-	Von Willebrand factor antigen	5.0	18.0	2.5	4.7
S-	Water	3.1	0.1	1.6	0.8
S-	Zeaxanthine	34.7	---	17.4	---
S-	Zinc	9.3	9.4	4.7	3.3
P-	Zinc	11.0	14.0	5.5	4.5

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