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	Ees- ja perekonnanimi	Ametikoht	kuupäev

REFERENCE VALUES FOR CLINICAL CHEMISTRY TESTS

Analyte	Age	Reference range	Units	Reference
Adalimumab	All age groups	The therapeutic concentration depends on the diagnosis and is 4.5–12 according to various literature sources.	mg/L	
Adalimumab antibodies	All age groups	< 10 negative > 10 positive	µg/L	42
Adrenocorticotropic hormone (P-ACTH)	≥ 18 y	Morning 7.00–10.00 a.m 1.6–13.9	pmol/L	1, 2
Alanine aminotransferase (S,P-ALAT)	< 1 y 1 y – < 4 y 4 y – < 7 y 7 y – < 13 y 13 y – < 18 y ≥ 18 y	< 71 < 31 < 36 < 44 < 45 M < 50 F < 35	U/L	1 1, 2
Albumin (S,P-Alb)	< 4 d 4 d – < 14 y 14 y – < 18 y ≥ 18 y	28–44 38–54 32–45 35–52	g/L	2, 5 2
Albumin (high sensitivity) (S,P-Alb-hs)	< 4 d 4 d – < 14 y 14 y – < 18 y ≥ 18 y	28–44 38–54 32–45 35–52	g/L	2
Albumin in cerebrospinal fluid CSF-Alb CSF-Alb/S-Alb-hs	 ≥ 18 y < 1 m 1 m – < 6 m 6 m – < 16 y 16 y – < 41 y 41 y – < 61 y	 110–350 < 0.025 < 0.015 < 0.005 < 0.007 < 0.008	mg/L	 2 1 (2004) 1, 2
Albumin in urine U-Alb/U-Crea dU-Alb	< 1 m 1 m – < 1 y 1 y – < 6 y 6 y – < 11 y 11 y – < 16 y ≥ 16 y All age groups	< 21 < 3.8 < 3.3 < 2.7 < 2.1 M < 2.5 F < 3.5 < 30	g/moL mg/d µg/min	1 5 2
Alcohol surrogates (P-Alcohol surrogates) Metanol (P-MetOH) Etanol (P-EtOH) Isopropanol (P-Isopropanol) Propanol (P-Propanol)	 All age groups	 < 0,02 < 0,2 < 0,01 < 0,02	 g/L	

Acetone (P-Acetone) Etylenglycol (P-EG) Propylenglycol (P-PG)		< 0,01 < 0,06 < 0,1		
Aldosterone (S,P-Aldo)	4 d – < 8 d 1 m – < 1 y 1 y – < 2 y 2 y – < 10 y 10 y – < 15 y 15 y – < 66 y	supine 5.0–175.0 supine 5.0–90.0 supine 7.0–54.0 upright 5.0–80.0 upright 4.0–48.0 upright 3.7–43.2	ng/dL	5 42
Alprazolam	All age groups	Therapeutic 5–50 Toxic > 100	µg/L	9
Amylase (S,P-Amyl)	≥ 18 y	28–100	U/L	1, 2
Alpha-1-antitrypsin (S,P-AAT)	< 1 m 1 m – < 7 m 7 m – < 3 y 3 y – < 20 y ≥ 20 y	1.24–3.48 1.11–2.97 0.95–2.51 1.10–2.80 0.90–2.00	g/L	1 2
Alpha-fetoprotein (S-AFP)	< 1 m 1 m – < 6 m 6 m – < 1 y 1 y – < 19 y ≥ 19 y	> 1004 39.8 – > 1004 2.9–57.3 ≤ 5.8 ≤ 5.8		44 2
Alkaline phosphatase (S,P-ALP)	< 15 d 15 d – < 1 y 1 y – < 10 y 10 y – < 13 y 13 y – < 15 y 15 y – < 17 y 17 y – < 19 y ≥ 19 y	83–248 122–469 142–335 129–417 M 116–468 F 57–254 M 82–331 F 50–117 M 55–149 F 45–87 M 40–129 F 35–104	U/L	 2
Alkaline phosphatase, isoenzymes, fraction activity (S-ALP-isoE)	≥ 18y	liver 1 < 71 bone < 69 liver 2 < 13 intestine < 13	U/L	
Amphetamines in urine (U-Amp)	All age groups	negative		
Amikacin (S,P-Amic)	All age groups	Pre-dose (trough) concentration: therapeutic range 5–10 toxic > 10 Peak concentration therapeutic 20–25 toxic > 35	mg/L	2
Ammonia (P-NH4)	< 2 d 2 d – < 6 d 6 d – < 18 y ≥ 18 y	< 144 < 134 < 48 M 16–60 F 11–51	µmol/L	1 (2004) 2
Androstenedione (S,P-Androst)	< 14 d 14 d – < 1 y 1 y – < 6 y 6 y – < 10 y 10 y – < 12 y 12 y – < 15 y 15 y – < 19 y	< 2.54 0.09–2.1 0.09–0.57 0.2–0.92 < 2.54 M 0.51–2.01 F 0.74–6.01	nmol/L	44

	≥ 19 y	M 0.87–3.55 F 0.48–6.45 M 0.98–5.32 F 1.71–4.58		2
Angiotensin-converting enzyme (S,P-ACE)	6 m – < 18 y ≥ 18 y	29–112 20–70	U/L	17
Anti-Myller Hormone (S,P-AMH)	≥ 18 y 20 y – < 25 y 25 y – < 30 y 30 y – < 35 y 35 y – < 40 y 40 y – < 45 y 45 y – < 51 y	M 0.8–14.5 F 1.2–11.7 F 0.9–9.9 F 0.6–8.1 F 0.1–7.5 F 0.03–5.5 F 0.01–2.7	µg/L	2
Antistreptolysin O (S,P-ASO)	< 6 y 6 y – < 18 y ≥ 18 y	< 150 < 240 < 200	kU/L	1 1, 2
Aripiprazole and dehydroaripiprazole (P-Aripiprazole+dehydroaripiprazole)	All age groups	Therapeutic range 150–500 Toxic > 1000	µg/L	11
Aspartate aminotransferase (S,P-ASAT)	< 2 d 2 d – < 6 d 6 d – < 1 y 1 y – < 4 y 4 y – < 7 y 7 y – < 13 y 13 y – < 18 y ≥ 18 y	< 122 < 110 < 96 < 71 < 53 < 50 < 46 M < 50 F < 35	U/L	1 1, 2
Barbiturates in urine (U-Bar)	All age groups	negative		
Benzodiazepines in urine (U-Bzd)	All age groups	negative		
Beta-2-microglobulin (S,P- β2-M)	1 d – < 1 m 1 m – < 6 m 6 m – < 1 y 1 y – < 4 y 4 y – < 7 y 7 y – < 10 y 10 y – < 13 y 13 y – < 16 y 16 y – < 19 y 19 y – 60 y ≥ 60 y	M 1603–4790 F 1722–4547 M 1423–3324 F 1024–3774 M 897–3095 F 999–2282 M 827–2228 F 742–2396 M 567–2260 F 546–2170 M 772–1712 F 736–1766 M 699–1836 F 704–1951 M 681–1954 F 787–1916 M 724–1874 F 555–1852 800–2400 ≤ 3000	µg/L	3 2

Betahydroxybutyrate (POCT) (B-BHB POCT)	All age groups	< 0,6	mmol/L	45
Bile acids (S,P-TBA)	≥ 18 y	< 10	µmol/L	2
Bilirubin (S,P-Bil)	< 2 d (full term) 2 d – < 3 d (full term) 3 d – < 4 d (full term) 4 d – < 7 d (full term) < 2 d (preterm) 2 d – < 3 d (preterm) 3 d – < 6 d (preterm) 1 m – < 18 y ≥ 18 y	< 150 < 193 < 217 < 216 < 140 < 205 < 410 < 17 < 21	µmol/L	1 2
Bilirubin (conjugated) (S,P-Bil-conj)	< 1 m ≥ 1 m	< 10 ≤ 3.4	µmol/L	1 2
Bromazepam	All age groups	Therapeutic 50–200 Toxic > 300	µg/L	9
B-type natriuretic propeptide, N-terminal fragment (S,P-NT-proBNP)	1 y – < 2 y 2 y – < 6 y 6 y – < 18 y ≥ 17 y	< 400 < 300 < 160 < 125 (cut-off value for excluding chronic heart failure) < 300 (cut-off value for excluding acute heart failure)	ng/L	25 2
Cocaine in urine (U-Coc)	All age groups	negative		
C-peptide (S,P-C-pept)	≥ 18 y	0.37–1.47	nmol/L	1, 2
C-reactive protein (S,P-CRP)	≥ 18 y	< 5	mg/L	1, 2
C-reactive protein, high sensitivity (S,P-CRP-hs)	< 3 w 2 m – < 16 y ≥ 18 y	< 4.1 < 2.8 For cardiovascular disease risk assessment: low risk < 1.0 medium risk 1.0–3.0 high risk > 3.0	mg/L	1 2
Dehydroepiandrosterone sulfate (S,P-DHEAS)	< 1 w 1 w – < 1 m 1 m – < 1 y 1 y – < 5 y 5 y – < 10 y 10 y – < 15 y 15 y – < 20 y 20 y – < 25 y 25 y – < 35 y 35 y – < 45 y 45 y – < 55 y	2.93–16.5 0.86–11.7 0.09–3.35 0.01–0.53 0.08–2.31 M 0.66–6.70 F 0.92–7.60 M 1.91–13.4 F 1.77–9.99 M 5.73–13.4 F 4.02–11.0	µmol/L	1, 2

	55 y – < 65 y 65 y – < 75 y ≥ 75 y	M 4.34–12.2 F 2.68–9.23 M 2.41–11.6 F 1.65–9.15 M 1.20–8.98 F 0.96–6.95 M 1.40–8.01 F 0.51–5.56 M 0.91–6.76 F 0.26–6.68 M 0.44–3.34 F 0.33–4.18		
Delta amino-levulinic acid in urine (U-DALA)	≥ 18 y	< 34,3	µmol/L	31
Delta amino-levulinic acid/creatinine in urine (U-DALA/U-Crea)	≥ 18 y	< 3,9	mmol/mol	36
Diazepam + desmethyldiazepam (nordiazepam)	All age groups	Therapeutic 125–2500 Toxic > 3000	µg/L	9
Digoxin (S,P-Digox)	≥ 18 y	Therapeutic level 0.5–0.8 Toxic > 1.2	µg/L	51
Erythropoietin (S,P-EPO)	1 y – < 4 y 4 y – < 7 y 7 y – < 10 y 10 y – < 13 y 13 y – < 16 y 16 y – < 18 y ≥ 18 y	M 1.7–17.9 F 2.1–15.9 M 3.5–21.9 F 2.9–8.5 M 1.0–13.5 N 2.1–8.2 M 1.0–14.0 N 1.1–9.1 M 2.2–14.4 N 3.8–20.5 M 1.5–15.2 N 2.0–14.2 4.3–29.0	U/L	3 48
Ethanol (S,P-EtOH)	All age groups	< 0.2	g/L	23
Ecstasy in urine (U-Ecs)	All age groups	negative		
Phenobarbital (S,P-Phenobarb)	All age groups	Therapeutic range10–30 Toxic > 40	mg/L	2
Ferritin (S,P-Fer)	< 1 y 1 y – < 4 y 4 y – < 7 y 7 y – < 13 y 13 y – < 18 y 18 y – < 61 y	12–327 6–67 4–67 M 14–124 F 7–84 M 14–152 F 13–68 M 30–400 F 13–150	µg/L	1 2
Folate (S,P-Fol)	< 7 y 7 y – < 12 y 12 y – < 18 y 18 y – < 66 y	> 17.3 > 37.9 > 17.8 8.8–60.8	nmol/L	44 2
Follicle stimulating hormone (S,P-FSH)	< 1 y 1 y – < 9 y 9 y– < 12 y 12 y – < 18 y ≥ 18 y	M 0.1–3.2 N 1.6–19 M 0.2–2.1 N 0.7–5.8 M 0.4–4.2 N 0.5–7.6 M 0.9–7.1 N 0.9–9.1 M 1.5–12.4 F follic. 3.5–12.5 ovul 4.7–21.5 luteal 1.7–7.7 postmenop 25.8–134.8	U/L	44 1, 2

Phosphate (S,P-P)	<15 d 15 d – < 1 y 1 y – < 5 y 5 y – < 13 y 13 y – < 16 y 16 y – < 19 y ≥ 19 y	1.71–3.15 1.47–2.54 1.33–2.06 1.28–1.82 F 1.00–1.70 M 1.11–1.88 0.94–1.55 0.81–1.45	mmol/L	44 2
Phosphate in urine U-P (first morning urine) dU-P U-P/U-Crea	 ≥ 18 y 12 y – < 61 y 6 m – < 1 y 1 y– < 2 y 2 y – < 3 y 3 y – < 5 y 5 y – < 7 y 7 y – < 10 y 10 y – < 14 y 14 y – < 18 y	 13–44 13–42 1.2–19 1.2–14 1.2–12 1.2–8.0 1.2–5.0 1.2–3.6 0.8–3.2 0.8–2.7	 mmol/L mmol/d mol/mol	 1, 2 1, 2 4
Gamma glutamyltransferase (S,P-GGT)	< 2 d 2 d – < 6 d 6 d – < 7 m 7 m – < 1 y 1 y – < 4 y 4 y – < 7 y 7 y – < 13 y 13 y – < 18 y ≥ 18 y	< 151 < 185 < 204 < 34 < 18 < 23 < 17 M < 45 F < 33 M < 60 F < 40	U/L	1 1, 2
Gamma-hydroxybutyrate in urine (U-GHB)	All age groups	negative		
Gastrin (S,P-Gastr)	≥ 18 y	6.2–54.8	pmol/L	48
Gentamicin (S,P-Genta)	All age groups	Pre-dose (trough) concentration: therapeutic range 0.5–2 toxic > 2	mg/L	2
Glucose in serum/plasma, fasting (fS,fP-Gluc)	< 2 d 2 d – < 1 m 1 m – < 18 y ≥ 18 y	2.2–3.3 2.8–4.4 3.3–5.6 ≤ 6.0	mmol/L	5 15
Glucose in cerebrospinal fluid CSF-Gluc CSF-Gluc/S,P-Gluc	 < 18 y ≥ 18 y ≥ 18 y	 3.33–4.44 2.22–3.89 ~0.6	 mmol/L	 2 2 13
Glycated hemoglobin (B-HbA1c)	All age groups	4.8–5.9 29–42	% of total Hb mmol/mol	2
Glucose tolerance test (GTT): • Glucose in serum/plasma, fasting (fS,fP-Gluc 0 min) • Glucose in serum/plasma, 120 min	All age groups	<u>Normal</u>: 0 min ≤ 6.0 120 min < 7.8 <u>Diabetes:</u> 0 min ≥ 7.0 120 min ≥ 11.1 <u>Impaired glucose</u>	mmol/L	15

after oral administration of glucose (S,P-Gluc 120 min)		tolerance (IGT): 0 min < 7.0 120 min 7.8–11.0 Impaired fasting glucose (IFG): 0 min 6.1–6.9 120 min < 7.8		
Glucose-6-phosphate dehydrogenase (RBC-G6PD/B-Hb)	≥ 18 y	8.0–14.5	U/gHb	33
Haloperidol (P-Haloperidol)	All age groups	Therapeutic range 1–10 Toxic > 15	µg/L	11
Acid-base balance (aB-ABB) pH (aB-pH) Oxygen, partial pressure (aB-pO_2) Carbon dioxide, partial pressure (aB-pCO_2) Bicarbonate (aB-HCO_3) Base excess (aB-BE)	 ≥ 1 d ≥ 1 d ≥ 18 y ≥ 18 y ≥ 18 y	 7.35–7.45 83–108 M 35–48 F 32–45 M 24–31 F 22–31 M (-2.7) –(+2.5) F (-3.4)–(+1.4)	 mmHg mmHg mmol/L	5 35
Haptoglobin (S,P-Hapto)	< 15 d 15 d – < 1 y 1 y– < 12 y 12 y – < 18 y ≥ 1 8y	< 0.1 0.1–2.2 0.1–1.6 0.1–1.8 0.3–2.0	g/L	5 2
Hemoglobin in plasma (P-Hb)	≥ 18 y	< 100	mg/L	5
Holotranscobalamin (S-HoloTC)	20 y – < 80 y	37.5–188	pmol/L	2
Homocysteine (S,P-Hcy)	5 d – < 1 y 1 y – < 7 y 7 y – < 12 y 12 y – < 15 y 15 y – < 19 y ≥ 19 y	< 10.0 < 7.6 < 8.4 < 10.4 N < 11.9 M < 13.4 < 12.0	µmol/L	44 2
5-hydroxyindoleacetic acid in 24h urine (dU-5-HIAA)	≥ 18 y	2–8	mg/d	9
Monoclonal immunoglobulines in serum (S-Monclon-Ig)	All age groups	Normal finding is negative for monoclonal immunoglobulines		
Monoclonal immunoglobulines in urine (U-Monoclon-Ig)	All age groups	Normal finding is negatiive for monoclonal immunoglobulines		
Immunoglobulin A (S,P-IgA)	< 1 y 1 y – < 3 y 3 y – < 6 y 6 y – < 14 y 14 y – < 19 y ≥ 19 y	3.2–12.0 1.5–6.3 3.2–9.9 5.0–11.7 6.0–13.1 0.70–4.00	g/L	44 2
Immunoglobulin G (S,P-IgG)	< 15 d 15 d – < 1 y 1 y – < 4 y 4 y – < 10 y 10 y – < 19 y	3.2–12.0 1.5–6.3 3.2–9.9 5.0–11.7 6.0–13.1	g/L	44

	≥ 19y	7.00–16.00		2
Immunoglobulin G in cerebrospinal fluid (CSF-IgG)	≥ 18 y	10–30	mg/L	2
Immunoglobulin G index (CSF-S-IgG-ind)	≥ 18 y	< 0.6		7
Immunoglobulin M (S,P-IgM)	< 15 d 15 d – < 13 w 13 w – < 1 y 1 y – < 19 y ≥ 19 y	< 0.3 0.1–0.7 0.1–0.8 M 0.4–1.4 N 0.4–1.8 0.40–2.30	g/L	44 2
Immunoglobulin free light chains: • kappa free light chains (S,P-IgKappa free) • lambda free light chains (S,P-IgLambda free) • ratio: kappa free light chains/lambda free light chains	≥ 18 y	2.37–20.73 4.23–27.69 0.22–1.74	mg/L	2
Insulin (S,P-Ins)	 3 y – < 3.5 y 3.5 y – < 4 y 4 y – < 4.5 y 4.5 y – < 5 y 5 y – < 5.5 y 5.5 y – < 6 y 6 y – < 6.5 y 6.5 y – < 7 y 7 y – < 7.5 y 7.5 y – < 8 y 8 y – < 8.5 y 8.5 y – < 9 y 9 y – < 9.5 y 9.5 y – < 10 y 10 y – < 10.5 y 10.5 y – < 11 y ≥ 18 y	Women Men 0.5–8.4 0.4–7.0 0.6–8.7 0.4–7.7 0.6–9.0 0.5–8.3 0.7–9.3 0.6–8.8 0.8–9.6 0.7–9.2 0.9–9.7 0.8–9.5 1.0–9.8 0.9–9.8 1.1–10.0 1.0–10.0 1.3–10.3 1.1–10.2 1.4–10.8 1.2–10.5 1.6–11.4 1.3–10.9 1.9–12.2 1.5–11.4 2.2–13.1 1.7–12.1 2.5–14.1 1.9–12.9 2.8–15.1 2.1–13.5 3.2–16.1 2.4–14.2 2.6–24.9	mU/L	26 1, 2
Insulin-like growth factor 1 (S,P-IGF-1)	 < 2y 2 y 3 y 4 y 5 y 6 y 7 y 8 y 9 y 10 y 11 y 12 y 13 y 14 y 15 y – < 18 y 18 y – < 22 y	Women Men 13.8–104 11.8–96.4 26.1–128 13.9–104 34.2–155 18.9–116 43.2–185 26.8–134 53.0–216 36.6–156 63.6–250 47.1–184 75.0–286 57.5–216 87.3–324 67.5–254 99.9–363 76.9–296 112–398 85.7–343 123–427 93.9–392 132–451 101–434 140–468 108–467 146–480 115–489 151–485 120–503 148–466 132–476	µg/L	2

	22 y – < 26 y 26 y – < 31 y 31 y – < 36 y 36 y – < 41 y 41 y – < 46 y 46 y – < 51 y 51 y – < 56 y 56 y – < 62 y ≥ 62 y	130–392 132–370 112–329 120–295 100–271 109–253 91.4–238 98.5–239 83.3–225 88.5–226 75.7–219 78.8–214 68.6–214 68.9–203 60.7–201 60.0–195 55.1–179 49.6–189		
Interleukin 6 (S-IL-6)	≥ 18 y	< 7	ng/L	2
Isoniasiid (S,P-Isoniazid)		Peak concentration 3–6 (300 mg/day) 9–15 (900 mg twice a weak)	mg/L	49
Potassium (S,P-K)	1 d – < 8 d 8 d – < 1 m 1 m – < 7 m 7 m – < 1 y 1y – < 18 y ≥ 18 y	3.2–5.5 3.4–6.0 3.5–5.6 3.5–6.1 3.3–4.6 3.4–4.8	mmol/L	1 5
Potassium in urine dU-K U-K (first morning urine)	6 y – < 10 y 10 y – < 15 y ≥ 15 y ≥ 18 y	M 17–54 F 8–37 M 22–57 F 18–58 25–125 20–80	mmol/d mmol/L	5 1, 2, 5 1
Calprotectin in stool (St-Calpro)	6 m – < 2 y 2 y – < 4 y ≥ 4 y	< 250 < 100 ≤ 50	µg/g	47
Calcitonin (S,P-CT)	< 3 m 3 m – < 6 m 6 m – < 9 m 9 m – < 18 m 18 m – < 3 y 3 y – < 17 y ≥ 17 y	≤ 10 ≤ 8.0 ≤ 6.4 ≤ 5.0 ≤ 3.0 ≤ 2.0 M ≤ 2.78 N ≤ 1.87	pmol/L	46 2
Calcium (S,P-Ca)	< 11 d 11 d – < 3 y 3 y – < 13 y 13 y – < 18 y 18 y – < 60 y 60 y – < 90 y ≥ 90 y	1.90–2.60 2.25–2.75 2.20–2.70 2.10–2.55 2.15–2.50 2.20–2.55 2.05–2.40	mmol/L	1 2
Calcium (ionized) (S,P-iCa)	≥ 18 y	1.16–1.32	mmol/L	1
Calcium in urine dU-Ca U-Ca/U-Crea	 < 18 y ≥ 18 y 6 m – < 1 y 1 y – < 2 y 2 y – < 3 y 3 y – < 5 y 5 y – < 7 y 7 y – < 18y	 < 0.15 2.5–7.5 0.09–2.2 0.07–1.5 0.06–1.4 0.05–1.1 0.04–0.8 0.04–0.7	 mmol/kg/d mmol/d mol/mol	 1 2 4
Cannabinoids in urine (U-THC)	All age groups	negative		
Carbamazepine (S,P-Carba)	All age groups	Therapeutic range 4–12	mg/L	2, 5

		Toxic > 15		
Carboxyhemoglobin (B-COHb)	≥ 18 y	0.5–1.5	% of total Hb	5
Carcinoembryonic antigen (S,P-CEA)	20 y – < 70 y	Non-smokers < 3.8 Smokers < 5.5	µg/L	1, 2
Carbohydrate antigen 15-3 (S,P-CA 15-3)	≥ 18 y	≤ 25	kU/L	1, 2
Carbohydrate antigen 19-9 (S,P-CA 19-9)	≥ 18 y	< 27	kU/L	1, 2
Carbohydrate antigen 72-4 (S,P-CA 72-4)	≥ 18 y	< 6.9	kU/L	2
Carbohydrate antigen 125 (S,P-CA 125)	≥ 18 y	F < 35	kU/L	1, 2
HE4 (S,P-HE4) ROMA value	Premenopausal Postmenopausal Premenopausal Postmenopausal	< 70 < 140 < 11.4 low risk of finding epithelial ovarian cancer < 29.9 low risk of finding epithelial ovarian cancer	pmol/L %	2 2
S-100 (S-S-100)	≥ 18 y	≤ 0.105	µg/L	1, 2
Growth hormone (S,P-GH)	 < 11 y 11 y – < 18 y ≥ 18 y	Men Women 0.280–18.87 0.360–23.37 0.231–32.40 0.369–24.15 <0.09–7.41 0.378–29.64	mU/L	2
Clarithromysin (S,P-Clarithromycin)		Peak concentration >2	mg/L	49
Clonazepam	All age groups	Therapeutic 10–80 Toxic > 100	µg/L	9
Chloride (S,P-Cl)	1 d – < 7 m 7 m – < 1 y 1 y – < 18 y ≥ 18 y	97–108 97–106 97–107 98–107	mmol/L	1 1, 2
Chloride in sweat (Sw-Cl)		normal < 30 borderline 30–60 cystic fibrosis > 60	mmol/L	28
Chloride in urine dU-Cl U-Cl (first morning urine)	< 1 y 1 y – < 6 y 6 y – < 10 y 10 y – < 15 y ≥ 15 y ≥ 18 y	2–10 15–40 M 36–110 F 18–74 M 64–176 F 36–173 110–250 46–168	mmol/d mmol/L	5 1, 2, 5 1
Clozapine	All age groups	Therapeutic 350–600 Toxic >1000	µg/L	11
Cholesterol (S,P-Chol)	1 d – < 1 m 1 m – < 6 m 6 m – < 1 y 1 y – < 4 y 4 y – < 7 y 7 y – < 10 y 10 y – < 13 y 13 y – < 16 y	M 1.40–3.90 F 1.60–4.01 M 2.09–3.80 F 1.60–3.65 M 1.97–4.63 F 1.97–5.59 M 2.20–4.71 F 2.79–4.99	mmol/L	1

	16 y – < 18 y ≥18 y recommended	M 2.84–5.61 F 2.74–4.99 M 2.84–5.46 F 2.69–5.43 M 2.72–5.77 F 2.72–5.64 M 2.35–5.28 F 2.79–5.30 M 2.12–4.97 F 2.38–6.05 < 5.0		16
HDL-Cholesterol (S,P-HDL-Chol)		M > 1.0 N > 1.2	mmol/L	16
Non-HDL-Cholesterol (S,P-non-HDL-Chol)	≥18 y recommended	< 3.9	mmol/L	16
LDL-Cholesterol (S,P-LDL-Chol)	≥18 y recommended	< 3	mmol/L	16
Complement component 3 (S,P-C3)	< 15 d 15 d – < 1y 1 y – < 19 y ≥ 19 y	0.57–1.29 0.58–1.69 0.9–1.61 0.9–1.8	g/L	44 1, 2
Complement component 4 (S,P-C4)	< 1 y 1 y – < 19 y ≥ 19 y	0.07–0.31 0.13–0.38 0.1–0.4	g/L	44 1,2
Cholinesterase (S,P-ChE) Dibucain number	< 16 y ≥ 16 y 16 y - < 40 y ≥ 40 y Pregnant woman, or woman using oral contraceptives (18 y – < 42 y) Phenotype UU Phenotype UA Phenotype AA Risk of scolin-apnoe	5320–12920 M 5320–12920 F 4260–11250 F 5320–12920 F 3650–9120 ≥ 73 57–72 ≤ 72 <57	U/L	1, 2
Chorionic gonadotropin (intact + β subunit) (S,P-hCG intact + β subunit)	≥ 18 y	M < 2.0 F nonpregnant ≤ 1.0 postmenopausal ≤ 7.0 During pregnancy 3. weak 5,8–71,2 4. weak 9,5–750 5. weak 217–7138 6. weak 158–31795 7. weak 3697–163563 8. weak 32065–149571 9. weak 63803–151410 10. weak 46509–186977	U/L	2

		12. weak 27832–210612 14. weak 13950–62530 15. weak 12039–70971 16. weak 9040–56451 17. weak 8175–55868 18. weak 8099–58176		
Chorionic gonadotropin, free β subunit (S-fβ-hCG)		Result is considered in complex of I trimester pregnancy screening	U/L	
Cortisol (S,P-Cort)	< 1 k 1 k – < 1 a 1 a – < 12 a 12 a – < 19 a ≥ 19 a	15–396 18–552 66–410 100–480 6–10 a.m 133–537 4–8 p.m 68.2–327	nmol/L	44 1, 2
Cortisol in saliva (Sal-Cort)	≥ 18 y	6.00 – 10.00 < 24.1 16.00 – 20.00 < 9.65 23.30 – 00.30 < 11.3	nmol/L	2
Creatine kinase (S,P-CK)	< 2 d 2 d – < 6 d 6 d – < 7 m 7 m – < 1 y 1 y – < 4 y 4 y – < 7 y 7 y – < 13 y 13 y – < 18 y ≥ 18 y	< 712 < 652 < 295 < 203 < 228 < 149 M < 247 F < 154 M < 270 F < 123 M < 308 F < 192	U/L	1 2
Creatine kinase, MB isoenzyme, mass (S,P-CK-MBm)	≥ 18 y	M < 6.22 F < 4.88	µg/L	2
Creatinine (S,P-Crea)	Preterm neonates < 2 m 2 m – < 1 y 1 y – < 3 y 3 y – < 5 y 5 y – < 7 y 7 y – < 9 y 9 y – < 11 y 11 y – < 13 y 13 y – < 15 y ≥ 15 y	29–87 27–77 14–34 15–31 23–37 25–42 30–47 29–56 39–60 40–68 M 59–104 F 45–84	µmol/L	2
Creatinine in urine U-Crea (first morning urine) dU-Crea	 ≥ 18 y 3 y – < 9 y 9 y – < 13 y 13 y – < 18 y ≥ 18 y	 M 3.5–24.6 F 2.6–20.0 0.97–6.0 1.5–12.5 2.6–16.5 M 9.0–19.0 F 6.0–13.0	 mmol/L mmol/d	 2 3 2
Creatinine clearance	5 d – < 8 d 1 m – < 3 m	> 38 > 54	mL/min/1,73m^2	1 (2004)

	3 m – < 1 y 3 y – < 14 y ≥ 18 y	> 64 > 120 66–143	mL/min/1,73m^2	1 (2004)
Estimated glomerular filtration rate (eGFR (Crea, CKD-EPI))	≥ 18 y	≥ 90	mL/min/1,73m^2	12
Cryoglobulins (S-Cryo)	≥ 18 y	< 50	mg/L	38
Uric acid (S,P-UA)	1 d – < 1 m 1 m – < 1 y 1 y – < 4 y 4 y – < 7 y 7 y – < 10 y 10 y – < 13 y 13 y – < 16 y 16 y – < 19 y ≥ 19 y	M 71–230 F 59–271 M 71–330 F 65–319 M 124–330 F 106–295 M 106–325 F 118–301 M 106–319 F 106–325 M 130–342 F 148–348 M 183–413 F 130–378 M 124–448 F 142–389 M 202–417 F 143–339 Target level in case of podagra therapy < 360	µmol/L	1 2
Uric acid in urine dU-UA U-UA (first morning urine)	 ≥ 18 y ≥ 18 y	 1.2–5.9 2.2–5.5	 mmol/d mmol/L	 1, 2 1, 2
Lactate dehydrogenase (S,P-LDH)	< 15 p 15 p – < 1a 1a – < 10 a 10 a – < 15 a 15 a – < 19 a ≥ 19 a	< 1128 < 424 < 305 < 260 < 240 < 250	U/L	44 2
Lactate dehydrogenase in pleural fluid (PlrF-LDH) expressed by ratio PlrF-LDH/S,P-LDH	All age groups	Transudate < 0.6 Exudate > 0.6		13, 1
Lactate vP-Lac aP-Lac	 ≥ 18 y ≥ 18 y	 < 2.2 < 1.6	 mmol/L	 1, 2
Lactate in cerebrospinal fluid (CSF-Lac)	< 3 d 3 d – < 11 d 11 d – < 18 y ≥ 18 y	1.1–6.7 1.1–4.4 1.1–2.8 1.1–2.4	mmol/L	1, 2
Lactose tolerance test (LTT)	All age groups	A rise in the blood glucose concentration < 1.1 hypolactasia 1.1–1.7 unclear > 1.7 normolactasia	mmol/L	20
Lamotrigine (S,P-Lamotr)	All age groups	Therapeutic 3.0–15 Toxic > 20	mg/L	9
Leflunomiid (P-Leflunomide)	All age groups	Therapeutic range is not uniquely determined. Before conception level must be < 0.02	mg/L	10
Levetiracetam (S,P-Levetir)	All age groups	12–46	mg/L	9
Lithium (S-Li)	≥ 18 y	Therapeutic 0.6–1.2	mmol/L	2

		Toxic > 2		
Linezolid (S,P-Linezolid)		Peak concentration 12–26	mg/L	49
Lipase (S,P-Lip)	< 1 m 1 m – < 13 y 16 y – < 18 y ≥ 18 y	< 34 < 31 < 55 13–60	U/L	1 2
Luteinizing hormone (S,P-LH)	< 6 m 6 m – < 11 y 11 y – < 14 y 14 y – < 18 y ≥ 18 y	M < 6.2 F < 8.2 M < 1.3 F < 1.3 M < 2.0 F < 10.0 M 1.3–8.4 F 0.4–25 M 1.7–8.6 F follic.phase 2,4–12,6 Ovul 14–95,6 lut.phase 1.0–11.4 postmenop 7.7–58.5	U/L	44 1, 2
Magnesium (S,P-Mg)	2 d – < 5 d 5 m – < 6 y 6 y – < 12 y 12 y – < 20 y 20 y – < 60 y 60 y – < 90 y ≥ 90 y	0.62–0.91 0.70–0.95 0.70–0.86 0.70–0.91 0.66–1.07 0.66–0.99 0.70–0.95	mmol/L	2, 5
Magnesium in urine dU-Mg U-Mg	 ≥ 18 y ≥ 18 y	 3.0–5.0 1.7–5.7	 mmol/d mmol/L	 2 1 (2004)
Methadone in urine (U-Mtd)	All age groups	negative		
Metamphetamines in urine (U-Met)	All age groups	negative		
Methemoglobin (B-MetHb)	≥ 18 y	< 0.6	% of total Hb	35
Meropenem (P-Meropenem)	All age groups	Therapeutic range is not uniquely determined, effect is assessed using minimal inhibitory concentration (MIC)	mg/L	21
Methotrexate (S,P-MTX)	All age groups	Therapeutic range depends on dose of MTX and specimen collecting time	µmol/L	39
Moxifloxacin (S,P-Moxifloxacin)		Peak concentration 3–5	mg/L	49
Mycophenolic acid (P-MPA)	All age groups	Depends on the type of transplantate and concomitant administration of some other drugs		2
Myoglobin (S,P-Myogl)	≥ 18 y	M 28–72 F 25–58	µg/L	1, 2
Sodium (S,P-Na)	< 8 d 8 d – < 2 m 2 m – < 7 m 7 m – < 1 y 1 y – < 18 y	131–144 132–142 132–140 131–140 132–141	mmol/L	1

	≥ 18 y	136–145		2
Sodium in urine dU-Na U-Na (first morning urine)	 6 y – < 10 y 10 y – < 15 y ≥ 15 y ≥ 18 y	 M 41–115 F 20–69 M 63–177 F 48–168 M 40–220 F 27–287 54–190	 mmol/d mmol/L	 5 1
Neuron specific enolase (S-NSE)	≥ 18 y	< 16.3	µg/L	2
Oxcarbazepin (S,P-Oxcarb)	All age groups	MHD conc 3.6–35	mg/L	9
Oxycodone in urine	All age groups	Negative		
Olanzapine (P-Olanzapine	All age groups	Therapeutic 20–80 Toxic > 100	µg/L	11
Oligoclonal immunoglobulin G in cerebrospinal fluid (CSF-IgG-oligo)	All age groups	Normal finding is negative		
Opiates in urine (U-Mop)	All age groups	negative		
Osmolality (S-Osmol)	18 y – < 61 y ≥ 61 y	275–295 280–300	mosm/kgH_2O	1
Osmolality in urine (U-Osmol)	≥ 18 y	400–800	mosm/kgH_2O	1
Parathyroid hormone (S-PTH)	< 1 k 1 k – < 1 a 1 a – < 11 a 11 a – < 19 a ≥ 19 a	0,7–6,3 0,9–6,5 1,2–6,3 1,6–7,2 M, F 1.8–7.8	pmol/L	44 1, 2
Paracetamol (S,P-Paracet)	≥ 18 y	Therapeutic range 10–30 Toxic > 200 (4 h after administration) > 100 (8 h after administration) > 50 (12 h after administration)	mg/L	2
Piperacillin (P-Piperacillin)	All age groups	Therapeutic range is not uniquely determined, effect is assessed using minimal inhibitory concentration (MIC)	mg/L	21
Posaconazole (P-Posaconazole)	All age groups	Therapeutic range is not uniquely determined, in case of prophylactic therapy suggested concentration is > 0,7	mg/L	18
Porphobilinogen in urine U-PBG U-PBG/U-Crea	 ≥ 18 y ≥ 18 y	 < 8.84 < 1.5	 µmol/L mmol/mol	 31 6
Porphyrines in urine U-Porph U-Porph/U-Crea	 ≥ 18 a ≥ 18 a	 20–320 < 38	 nmol/L µmol/mol	 31 36
Prealbumin (S-PreAlb)	< 15 d 15 d – < 1 y	< 0.11 0.04–0.24	g/L	1

	1 y – < 5 y 5 y – < 13 y 13 y – < 16 y 16 y – < 19 y ≥ 19 y	0.11–0.23 0.13–0.26 0.17–0.31 M 0.2–0.35 N 0.16–0.33 0.20–0.40		1, 2
Progesterone (S,P-Prog)	F 1 m – < 12 y F 12 y – < 19 y M 1 m – < 19 y ≥ 19 y	< 3 < 38 < 3 M 0.7–4.3 F follic.phase 0.6–4.7 ovulat.phase 2.4–9.4 lut.phase 5.3–86 postmenop. 0.3–2.5	nmol/L	44 1, 2
Procalcitonin (S,P-PCT)	<6 h 6 h – < 12 h 12 h – < 18 h 18 h – < 30 h 30 h – < 36 h 36 h – < 42 h 42 h – < 48 h ≥ 3 d	< 2 < 8 < 15 < 21 < 15 < 8 < 2 < 0.05 Value > 2 is indicative for sepsis	µg/L	50 2
Prolactin (S,P-Prol)	1 m– < 1 y 1 y – < 19 y ≥ 19 y	110–1274 64–532 M 86–324 F 102–496	mU/L	44 2
Prostate-specific antigen (S,P-PSA)	< 40 y 40 y – < 50 y 50 y – < 60 y 60 y – < 70 y ≥ 70 y	< 1.4 < 2.0 < 3.1 < 4.1 < 4.4	µg/L	1, 2
Free prostate-specific antigen (S,P-fPSA%)	All age groups	The risk of prostate cancer increases if fPSA% is < 15–25%	%	2
Pyrasinamid (S,P-Pyrasinamid)		Peak concentration 20–60 (25–35 mg/kg day) 60–90 (50 mg/kg day)	mg/L	49
Pregnancy assotiated protein A (S-PAPP-A)		Result is considered in complex of I trimester pregnancy screening	U/L	
Iron (S,P-Fe)	< 14 y 14 y – < 19 y ≥ 19 y	M, F 5.0–25.0 M 8.0–31.0 F 6.0–31.0 M 11.0–28.0 F 6.6–26.0	µmol/L	44 1
Renin (P-Renin)	14 d – < 4 m 4 m – < 1 y 1 y – < 3 y 3 y – < 5 y 5 y – < 7 y 7 y – < 11 y 11 y – < 15 y 15 y – < 18 y 18 y – < 66 y	11.2–147.9 supine 17.4–173.8 supine 21.4–102.3 supine 19.5–123.0 supine 20.4–128.8 supine 14.8–102.3 supine 13.8–104.7 supine 13.8–72.4 supine 5.3–99.1 upright	mU/L	43 42

Rheumatoid factor (S,P-RF)	≥ 18 y	< 14	kU/L	1, 2
Risperidone and 9-hydroksyrisperidoyne (P-Risperidone+9-hydroxyrisperidone)	All age groups	Therapeutic 20–60 Toxic > 120	µg/L	11
Salicylates (S,P-Salic)	≥ 18 y	Therapeutic range: antipyretic, analgetic 30–100 anti-inflammatory 150–300 Toxic > 300 lethal > 600	mg/L	2
Sirolimus (B-Sirolimus)	All age groups	Therapeutic range depends on indications of Sirolimus administration and specimen collection time	µg/L	2
Sex hormone binding protein (S,P-SHBG) Free androgen index (FAI)	< 1 k 1 k – < 13 a 13 a – < 15 a 15 a – < 19 a 19 a – < 50 a ≥ 50 y 20 y – < 50 y ≥ 50 y	> 16 > 37,5 21,1–152 M 13,6–62 N 21,6–127,0 M 18.3–54.1 F 32.4–128 M 20.6–76.7 F 27.1–128 M 35.0–92.6 F 0.297–5.62 M 24.30–72.1 F 0.187–3.63	nmol/L %	44 2 2
Carbohydrate deficient transferrin (IFCC) S-CDT (IFCC)	≥ 18 y	≤ 1.7% excessive alcohol consumption in the past two weeks is unlikely 1.8–2.0% borderline result, interpretation in relation to excessive alcohol consumption is not possible ≥ 2.1% the result indicates excessive alcohol consumption in the past two weeks	%	41
Tacrolimus (B-Tacro)	All age groups	Therapeutic range depends on indications of Tacrolimus administration and specimen collection time	µg/L	2
Theophylline (S,P-Theoph)	All age groups	Therapeutic range for bronchodilatation:	mg/L	

	(exept newborns) ≥ 18 y	10–20 Treatment of neonatal apnoe: 6–13 Toxic: > 20		1, 2 5 5
Testosteron (S,P-Testo) Free testosteron (S,P-fTesto calc)	< 6 m 6 m – < 11 y 11 y – < 19 y 11 y – < 15 y 15 y – < 19 y 19 y – < 50 y ≥ 50 y 18 y – < 50 y ≥ 50 y	M 0.2–19 F < 12 M, F < 0.10 F < 1.8 M < 20 M 1.7–24 M 8.64–29.0 F 0.29–1.67 M 6.68–25.7 F 0.10–1.42 M > 0.220 M > 0.180	nmol/L nmol/L	44 2 19
Thiopurine methyltransferase in erythrocytes (RBC-TPMT) Performer : Departement of Pharmacology, Tartu University	≥ 18 y	Concentration of 6-methylmercaptopurine after 60 min of incubation 59–110	ng/mL(RBC)/h	
Transferrin (S,P-Transf) Transferrin saturation	< 9 w 9 w – < 1 y 1 y – < 19 y ≥ 19 y ≥ 18 y	1.11–2.43 1.15–3.52 2.38–3.66 2.0–3.6 16–45	g/L %	44 2 1
Soluble transferrin receptor (S,P-Transf-sR)	9 m – < 1 y 18 y – < 83 y	4.1–7.7 1.71–4.13	mg/L	22 2
Triglycerides (S,P-Trigl)	Preterm neonates ≥ 18 y	< 0.7 recommended < 1.7 fasting < 2.0 nonfasting	mmol/L	1 16, 2
Free triiodthyronine (S,P-fT3)	< 6 d 6 d – < 4 m 4 m – < 1 y 1 y – < 7 y 7 y – < 12 y 12 y – < 21 y ≥ 21 y Pregnancy	2.65–9.68 3.00–9.28 3.30–8.95 3.69–8.46 3.88–8.02 3.93–7.70 3.10–6.80 I trim 3.8–6.0 II trim 3.2–5.5 III trim 3.1–5.0	pmol/L	1 1, 2 1
Tricyclic antidepressants in urine (U-TCA)	All age groups	negative		
Troponin T (high sensitivity) (S,P-cTnT-hs)	≥ 18 y	< 14 ≥ 14 myocardial necrosis	ng/L	2, 29

Ceruloplasmin (S,P-Cer)	< 2 m 2 m – < 6 m 6 m – < 1 y 1 y – < 8 y 8 y – < 14 y 14 y – < 19 y ≥ 19 y	0.07–0.24 0.13–0.33 0.14–0.39 0.22–0.43 0.21–0.40 M 0.17–0.35 N 0.21–0.43 M 0.15–0.30 F 0.16–0.45	g/L	5, 44 2
Zinc (S-Zn)	≥ 18 y	M 11.1–19.5 F 10.7–17.5	µmol/L	14
Antibodies to cyclic citrullinated peptide (S,P-CCP IgG)	All age groups	< 17	kU/L	2
Cycloserine (S,P-Cycloserine)	All age groups	Peak concentration: Therapeutic 20–35 Toxic > 35	mg/L	49
Cyclosporin A (B-CyA)	All age groups	Therapeutic range depends on indications of CyA administration and specimen collection time	µg/L	2
Cystatin C (S,P-CysC)	< 1 m 1 m – < 1 y 1 y – < 2 y 2 y – < 3 y 3 y – < 5 y 5 y – < 6 y 6 y – < 9 y 9 y – < 10 y 10 y – < 11 y 11 y – < 12 y 12 y – < 13 y 13 y – < 14 y 14 y – < 15 y 15 y – < 16 y 16 y – < 17 y 17 y – < 18 y 18 y – < 78 y	1.1–2.2 0.5–1.4 M 0.74–1.22 F 0.74-1.20 M 0.67–1.10 F 0.67–1.08 M 0.65–1.06 F 0.64–1.04 M 0.65–1.07 F 0.66–1.06 M 0.65–1.09 F 0.67–1.08 M 0.66–1.10 F 0.68–1.09 M 0.66–1.11 F 0.68–1.11 M 0.67–1.13 F 0.69-1.14 M 0.69–1.17 F 0.68–1.16 M 0.72–1.22 F 0.66–1.14 M 0.74–1.24 F 0.64–1.11 M 0.74–1.23 F 0.63–1.09 M 0.73–1.20 F 0.62–1.07 M 0.71–1.15 F 0.61–1.05 0.61–0.95	mg/L	1 30 2
Estimated glomerular filtration rate (eGFR (CysC, CKD-EPI))	≥ 18 y	≥ 90	mL/min/1,73m^2	12

Thyroglobulin (S,P-TG)	< 6 d 6 d – < 4 m 4 m – < 1 y 1 y – < 7 y 7 y – < 12 y 12 y – < 21 y ≥ 21 y	25–307 20–228 18–125 9.0–67 5.1–43 2.6–36 1.4–78	µg/L	1 2
Antibodies to thyroglobulin (S-TG IgG)	< 6 d 6 d – < 4 m 4 m – < 1 y 1 y – < 7 y 7 y – < 12 y 12 y – < 21 y ≥ 21 y	< 134 < 146 < 130 < 38 < 37 < 64 < 115	kU/L	1 1, 2
Antibodies to thyroid peroxidase (S,P-TPO IgG)	< 6 d 6 d – < 4 m 4 m – < 1 y 1 y – < 7 y 7 y – < 12 y 12 y – < 21 y ≥ 21 y	< 117 < 47 < 32 < 13 < 18 < 26 < 34	kU/L	1 1, 2
Thyroid-stimulating hormone (S,P-TSH)	< 6 d 6 d – < 4 m 4 m – < 1 y 1 y – < 7 y 7 y – < 12 y 12 y – < 21 y ≥ 21 y	0.70–15.2 0.72–11.0 0.73–8.35 0.70–5.97 0.60–4.84 0.51–4.30 0.27–4.2	mU/L	1 1, 2
Thyroid stimulating immunoglobulins (S,P-TSI)	≥ 18 y	< 0.1 > 0.55 cut off for Graves disease	U/L	48
Free thyroxine (S,P-fT4)	< 6 d 6 d – < 4 m 4 m – < 1 y 1 y – < 7 y 7 y – < 12 y 12 y – < 21 y ≥ 21 y Pregnancy	11.0–32.0 11.5–28.3 11.9–25.6 12.3–22.8 12.5–21.5 12.6–21.0 12.0–22.0 I trim 12.1–19.6 II trim 9.6–17.0 III trim 8.4–15.6	pmol/L	1 1, 2 1
Urea (S,P-Urea)	0 d – < 15 d 15 d – < 1 y 1 y – < 10 y 10 y – < 19 y ≥ 19 y	1.1–7.9 1.3–5.8 3.2–7.6 F 2.6–6.5 M 2.6–7.2 < 8.1	mmol/L	44 2
Urea in urine dU-Urea U-Urea (first morning urine)	 ≥ 18 y ≥ 18 y	 428–714 286–595	 mmol/d mmol/L	 2 2
Protein (S,P-Prot)	< 15 d 15 d – < 1 y 1 y – < 6 y 6 y – < 9 y	51–80 43–69 59–73 62–75	g/L	44

	9 y – < 19 y ≥ 19 y	63–78 64–83		1, 2
Protein in cerebrospinal fluid (CSF-Prot)	1 d – < 2 m 2 m – < 4 m 4 m – < 7 m 7 m – < 1 y 1 y – < 3 y 3 y – < 5 y 5 y – < 9 y ≥ 18 y	0.25–0.72 0.20–0.72 0.15–0.50 0.10–0.45 0.10–0.40 0.10–0.38 0.10–0.43 0.15–0.45	g/L	1 2
Protein in pleural fluid (PlrF-Prot) PlrF-Prot/S,P-Prot	All age groups	 transudate < 0.5 exudate > 0.5	g/L	13
Protein in urine dU-Prot U-Prot/U-Crea	 ≥ 18 y ≥ 18 y	 < 0.15 < 15	 g/d g/mol	 1 12
Protein fractions in serum (S-Prot-Fr)	≥ 18 y	albumin 35–52 globulins: alpha 1 1.0–3.0 alpha 2 4.0–8.0 beta 1 4.0–8.0 beta 2 2.0–7.0 gamma 7.0–17.0	g/L	
Protein fractions in urine (U-Prot-Fr)	All age groups	Results will be commented by laboratory doctor	mg/L	1, 2
Valproate (S,P-Valpr) Free valproate (S,P-fValpr) Free valproate % (S-fValpr%)	All age groups All age groups	Therapeutic 50–100 Toxic > 150 Therapeutic 5–15 5–15	mg/L mg/L %	1,2 2 24 52
Vancomycin (S,P-Vanco)	≥ 18 y	Pre-dose (trough) concentration: therapeutic range 15–20 AUC/MIC 400–600 (if MIC is ~ 1 mg/L)	mg/lL	40 27
Bicarbonate (S,P-HCO_3)	≥ 18 y	22–29	mmol/L	1, 2
Vitamin A (S,P-Vit A)	< 1 y 1 y – < 7 y 7 y – < 13 y 13 y – < 20 y ≥ 20 y	0.10–0.50 0.20–0.43 0.26–0.49 0.26–0.72 0.30–0.70	mg/L	9
Vitamin B1 (B-Vit B1)	All age groups	33.1–60.7	µg/L	9
Vitamin B6 (B-Vit B6)	All age groups	12.6–45.2	µg/L	9
Vitamin B12 (S,P-Vit B12)	< 1 m 1 m – < 1 y 1 y – < 12 y 12 y – < 19 y ≥ 19 y	138–1377 124–1236 261–1180 199–835 145–569	pmol/L	44 2
Vitamin E (S,P-Vit E)	< 1 y 1 y – < 7 y 7 y – < 13 y 13 y – < 20 y ≥ 20 y	1–8 3–9 4–9 6–10 5–20	mg/L	9

Vitamin D (S,P-Vit D(25-OH))	All age groups	Deficiency < 50	nmol/L	34
Vorikonazol (P-Voricon)	≥ 18 y	1.0–5.5	mg/L	9
Estradiol (S,P-E2)	1 m – < 18 y 1 m – < 10 y 10 y – < 14 y 14 y – < 18 y ≥ 18 y	M < 18 N < 18 N < 250 N 53.6–912 M < 159 F follic.phase 45–854 ovulat.phase151–1461 lut.phase 82–1251 postmenop. < 183	pmol/L	44 2

References

1 W.Heil, R. Koberstein, B.Zawta. Reference Ranges for Adults and Children. Pre-Analytical Considerations. Roche 2008
2 Cobas method sheets
3 S.J. Soldin, C.Brugnara, E.C.Wong. Pediatric Reference Ranges. AACC Press 2003
4 V.Matos, G.Melle, O.Boulat et al. Urinary phosphate/creatinine, calcium/creatinine and magnesium/creatinine ratios in a healthy pediatric population. The Journal of Pediatrics, volume 131, number 2
5 Burtis, Ashwood, Bruns. Tietz Textbook of Clinical Chemistry and Molecular Diagnostics. Elsevier Saunders 2018
6 European Porphyria Network (https://porphyria.eu/)
7 K.Kallion, K.Reimand, A.Orav. Comparison of the IgG index and oligoclonal IgG bands in CSF: finding out optimal cut-off value for IgG index. Abstract No: P 29 at the 31th Nordic Congress in Clinical Chemistry, June 14-18, Helsinki, Finland
8 TIAFT reference blood level list of therapeutic and toxic substances, september 2004
9 Chromsystems. Method sheets
10 Krause M, Amin S, Makol A. Use of DMARDs and biologics during pregnancy and lactation in rheumatoid arthritis: what the rheumatologist needs to know. Ther Adv Musculoskel Dis 2014; 6(5) 169–184
11 Hiemke C et al. Consensus Guidelines for Therapeutic Drug Monitoring in Neuropsychopharmacology: Update 2017. Pharmacopsychiatry 2018; 51: 9–62
12 KDIGO 2012 Clinical practice guideline for the evaluation and management of chronic kidney disease. Kidney Int 2013; vol 3, issue 1
13 Brunzel NA. Fundamentals of Urine and Bodyfluid Analysis. Saunders 2018
14 Randox Zinc Colorimetric Method Cat. No. ZN 2341 Reagent Information
15 Eesti 2. tüüpi diabeedi juhend 2016
16 European guidelines on cardiovascular disease prevention in clinical practice, 2016
2019 ESC/EAS Guidelines for themanagement of dyslipidaemias: lipid modification to reduce cardiovascular risk
17 Bühlmann. ACE kinetic. 2022-10-21
18 Ashbee HR et al. Therapeutic drug monitoring of antifungal agents: guidelines from the British Society for Medical Mycology. J Antimicrob Chemother 2014; 69:1162–1176

19 Bhasin S, Pencina M et al. Reference Ranges for Testosterone in Men Generated Using Liquid Chromatography Tandem Mass Spectrometry in a Community-Based Sample of Healthy Nonobese Young Men in the Framingham Heart Study and Applied to Three Geographically Distinct Cohorts. J Clin Endocrinol Metab. 2011 Aug; 96(8): 2430–2439
20 McPherson RA, Pincus MR. Henry's Clinical Diagnosis and Management by Laboratory Methods. Saunders 2007
21 Agency of Medicines. Register of medicinal products. Summary of product characteristic
22 Vendt, N. Rauapuudus ja rauapuudusaneemia 9-12 kuu vanustel imikutel Eestis. Doktoriväitekiri 2008
23 EV Liiklusseadus, 01.07.2011
24 UpToDate. Valproate: drug information
25 Nir A., Lindiger A et al. NT-pro-B-type Peptide in Infants and Children: Reference Values Based on Combined Data from Four Studies. Pediatr Cardiol 2009;30:3–8
26 Peplies J, Jiménez-Pavón D, Savva SC et al. Percentiles of fasting serum insulin, glucose, HbA1c and HOMA-IR in pre-pubertal normal weight European children from the IDEFICS cohort. International Journal of Obesity 2014; 38:39–S47
27 Rybak M, Le J. Therapeutic Monitoring of Vancomycin for Serious Methicillin-resistant Staphylococcus aureus Infections: A Revised Consensus Guideline and Review by the American Society of Health-system Pharmacists, the Infectious Diseases Society of America, the Pediatric Infectious Diseases Society, and the Society of Infectious Diseases Pharmacists. Am J Health-Syst Pharm. 2020;77:835-864
28 K.de Boeck, M.Wilschanski, C.Castellani et al. Cystic fibrosis: terminology and diagnostic algorithms. Thorax 2006; 61:627-635
29 Müokardiinfarkti nelja universaalne definitsioon, Eesti Arst 2019; 98(4):235–242
30 Ziegelasch N, Vogel M et al. Cystatin C serum levels in healthy children are related to age, gender and pubertal stage. Pediatric Nephrology 2019; 34:449–457
31 BioRad. ALA/PBG by column test, Sept 2015
32 Immulite Compendium, 2007
33 Koitsaar L. Kineetilisel ensümaatilisel meetodil määratava glükoos-6-fosfaadi dehüdrogenaasi referentsväärtusvahemiku leidmine Eesit populatsioonile. Tartu Tervishoiu Kõrgkooli bioanalüütiku õppekava lõputöö. Tartu 2023
34 Kull M, Kallikorm R, Lember M. D-vitamiin – taasleitud oluline tervisemõjur. Eesti Arst 2010; 89(3):185−190
35 The Blood Gas Handbook. Radiometer Copenhagen.2000
36 Karolinska Universitetslaboratoriet (https://www.karolinska.se/KUL)
37 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure, 2016
38 Le Carrer D. Serum Protein Electrophoresis and immunofixation. Laboratories Sebia, 2005
39 Alinity i, method sheet, Abbott
40 Rybak M, Lomaestro B et al. Therapeutic monitoring of vancomycin in adult patients: A Consensus Rewiew of the American Society of Health-System Pharmacists, the Infectious Diseases Society of America and the Society of Infetious Diseases Pharmacists. Am J Health-Syst Pharm. 2009; 66:82-98
41 Sebia, method sheets
42 IDS-iSYS method sheets

43 Krüger C, Rauh M., Dörr H. Immunoreactive renin concentrations in healthy children from birth to adolescence. Clinica Chimica Acta 1998; 274: 15-27
44 CALIPER database
45 Novanet method sheet
46 Castagna G et al. Reference Range of serum calcitonin in pediatric population. J Clin Endocrin Metabolism, March 2015
47 Povisen J, Samonson MH. Fecal calprotectin in healthy children from 0 to 4 years, ImmunoDiagnostics no7, 2013
48 Immulite 2000 method sheets, Siemens
49 Alsultan A and Peloquin CA. Therapeutic drug monitoring in the treatment of tuberculosis: an update. Drugs 2014;74:839-54
50 Pugin J, Meisner M et al, Guide for the Clinical Use of PCT In Diagnosis and Monitoring of Sepsis April 2007
51 Kroonilise südamepuudulikkusega täiskasvanud patsiendi käsitlus esmatasandil. Eesti Ravijuhend. RJ-I/52.1-2021
52 Roche cobas Valproehape – vaba valproehappe rakendus. 2014-10 v5 Eesti keel.