



TRACE METAL	SOURCE	REFERENCE INTERVAL
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BIOLOGICAL REFERENCE INTERVAL

Aluminium	Serum	< 0.73 umol/l
	Urine	< 39 ug/l

Biological Threshold Limit Value (BTLV) or Biological Exposure Index (BEI)

Arsenic	Blood	< 31.00 ug/l
	Urine	< 300ug/l

Biological Threshold Limit Value (BTLV) or Biological Exposure Index (BEI)

Cadmium	Blood	< 5.0 ug/l
	Urine	< 5.0 ug/g Creatinine

BIOLOGICAL REFERENCE INTERVAL

Chromium	Blood	< 1.1 ug/l	Biological Exposure Index (BEI)
	Urine	< 25 ug/l	
	Serum	0.6 ug/l	

BIOLOGICAL REFERENCE INTERVAL

Cobalt	Blood	< 1.8 ug/l
	Urine	< 15 ug/l
	Serum	1.9 ug/l

BIOLOGICAL REFERENCE INTERVAL

Copper	Serum	734 - 1714 ug/l
	Urine	15 -60 ug/ 24hrs

Biological Threshold Limit Value (BTLV) or Biological Exposure Index (BEI)

Lead	Blood	≤50 ug/dL for males and females ≥50 years old ≤30ug/dL for females < 50 years old ≤10ug/dL for children and non-occupationally exposed adults which is set by Workplace Safety and Health Guideline (Singapore).
	Urine	< 25 ug/l

BIOLOGICAL REFERENCE INTERVAL

Selenium	Blood	58 - 234 ug/l
	Urine	5.50 - 106 ug/l
	Serum	107 - 208 ug/l or 1.34 - 2.60 umol/L

BIOLOGICAL REFERENCE INTERVAL

Zinc	Blood	4400 - 8600 ug/l
	Urine	300 - 600 ug/l
	Serum	724 - 1244 ug/l or 11.07 - 19.03 umol/L

Biological Threshold Limit Value (BTLV) or Biological Exposure Index (BEI)

Manganese	Blood	< 30 ug/dl
	Urine	< 50 ug/l
	BIOLOGICAL REFERENCE INTERVAL	
	Serum	< 2.7 ug/l

Biological Threshold Limit Value (BTLV) or Biological Exposure Index (BEI)

Mercury	Blood	< 25 ug/l
	Urine	< 50 ug/l

BIOLOGICAL REFERENCE INTERVAL

Nickel	Serum	<6.5 ug/L (≥ 20 years)
	Urine	< 14 ug/l

BIOLOGICAL REFERENCE INTERVAL

Thallium	Blood	< 1.0 ug/l
	Urine	< 1.0 ug/l

Biological Threshold Limit Value (BTLV) or Biological Exposure Index (BEI)

TTMA	Urine	≤1.6 mg/g creatinine
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BIOLOGICAL REFERENCE RANGE

VHP - Vitamin D	Serum	Deficient : <10.0ng/mL Insufficient : 10.0-29.9ng/mL Desirable : 30.0-99.9ng/mL Possible Toxicity : ≥100.0ng/mL
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