February 20, 2024

CLINICAL BIOCHEMISTRY

Reporting Changes to Plasma Creatinine, Urea, Urea-Creatinine Ratio, Calcium, Phosphate and Parathyroid Hormone (PTH) – Reference Intervals Update

Date effective: March 4, 2024

Effective March 4, 2024, the reference intervals for plasma creatinine, urea, urea-creatinine ratio (UCR), calcium, phosphate and PTH tests performed at Shared Health laboratories will be revised as a part of ongoing quality improvement.

Change:

Revised reference intervals are evidence-based and supported by literature. Pediatric reference intervals are being updated in accordance with the Canadian Laboratory Initiative on Pediatric Reference Intervals (CALIPER). Adult reference intervals are literature-based and have been verified in our local population where possible.

There is no change in testing methodologies. Some patients may reclassify depending on their sex and age reference interval partition.

To align with PTH testing across Canada, reporting units will change to SI units, i.e. from ng/L to pmol/L (conversion 1 ng/L = 0.106 pmol/L or 1 pmol/L = 9.43 ng/L).

Please refer to Appendix I and II for comparison of current and revised reference intervals.

Contact Information:

Dr. Eleonora Petryayeva | Clinical Biochemist, Clinical Biochemistry | Diagnostic Services
phone: 431-373-0322 | email: epetryayeva@sharedhealthmb.ca

Dr. Laurel Thorlacius | Medical Director, Clinical Biochemistry | Diagnostic Services
phone: 204-787-8858 | email: lthorlacius@sharedhealthmb.ca

APPENDIX I. Creatinine, Urea and Urea-Creatinine Ratio (UCR) Reference Intervals

Creatinine (Plasma):

New			Current		
Age	**Male**	**Female**	**Age**	**Male**	**Female**
0 – 14 d	35 – 86 µmol/L		0 – 4 wk	27 – 88 µmol/L	
15 d – 1 y	15 – 38 µmol/L		5 wk – 5 y	18 – 35 µmol/L	
2 – 4 y	24 – 43 µmol/L		6 – 12 y	27 – 62 µmol/L	
5 – 11 y	33 – 59 µmol/L		13 – 18 y	44 – 88 µmol/L	
12 – 14 y	45 – 77 µmol/L		≥ 19 y	44 – 106 µmol/L	35 – 97 µmol/L
15 – 18 y	60 – 100 µmol/L	48 – 79 µmol/L			
≥ 19 y	59 – 104 µmol/L	45 – 84 µmol/L			

Urea (Plasma):

New			Current		
Age	**Male**	**Female**	**Age**	**Male**	**Female**
0 – 14 d	1.1 – 7.9 mmol/L		All	2.8 – 7.1 mmol/L	
15 d – 12 mo	1.3 – 5.8 mmol/L				
1 – 9 y	3.2 – 7.6 mmol/L				
10 – 18 y	2.6 - 7.2 mmol/L	2.6 - 6.5 mmol/L			
≥ 19 y	2.8 – 8.1 mmol/L				

Urea Creatinine Ratio, UCR (Plasma):

New			Current		
Age	**Female**	**Male**	**Age**	**Female**	**Male**
0 – 14 d	21 – 162		All	<70	
15 d – <1 y	49 – 438				
1 – 2 y	127 – 419				
3 – 4 y	130 – 299				
5 – 7 y	87 – 246				
8 – 9 y	69 - 177	83 – 189			
10 – 14 y	50 – 146				
15 – 18 y	44 – 107				
≥ 19y	40 – 100				

**Urea/Creatinine Ratio = [Urea (mmol/L) x 1000] / Creatinine (µmol/L)*

- *The conversion factor of 1000 in the equation is to compensate for the difference in units between urea and creatinine.*

APPENDIX II. Calcium, Phosphate and Parathyroid Hormone (PTH) Reference Intervals

Calcium, Total (Plasma):

New			Current		
Age	**Male**	**Female**	**Age**	**Male**	**Female**
0 – 12 mo	2.16 – 2.74 mmol/L		All	2.1 – 2.6 mmol/L	
1 – 18 y	2.31 – 2.64 mmol/L				
19 – 59 y	2.15 – 2.50 mmol/L				
60 – 89 y	2.20 – 2.55 mmol/L				
≥ 90 y	2.05 – 2.40 mmol/L				

Phosphate (Plasma):

New			Current		
Age	**Male**	**Female**	**Age**	**Male**	**Female**
0 – 14 d	1.71 – 3.15 mmol/L		0 - 4 wk	1.25 - 2.25 mmol/L	1.40 - 2.50 mmol/L
15d – 12 m	1.47 – 2.54 mmol/L		5 wk - 12 mo	1.15 - 2.15 mmol/L	1.20 - 2.10 mmol/L
1 – 4 y	1.33 – 2.06 mmol/L		1 - 3 y	1.00 - 1.95 mmol/L	1.10 - 1.95 mmol/L
5 – 12 y	1.28 – 1.82 mmol/L		4 - 6 y	1.05 - 1.80 mmol/L	
13 – 15 y	1.11 - 1.88 mmol/L	1.00 - 1.70 mmol/L	7 - 9 y	0.95 - 1.75 mmol/L	1.00 - 1.80 mmol/L
16 – 18 y	0.94 – 1.55 mmol/L		10 - 12 y	1.05 - 1.85 mmol/L	1.05 - 1.70 mmol/L
≥ 19 y	0.81 – 1.45 mmol/L		13 - 15 y	0.95 - 1.65 mmol/L	0.90 - 1.55 mmol/L
			16 - 18 y	0.85 - 1.60 mmol/L	0.80 - 1.55 mmol/L
			≥ 19 y	0.81 - 1.45 mmol/L	

Parathyroid Hormone, PTH (Plasma):

New			Current		
Age	**Male**	**Female**	**Age**	**Male**	**Female**
0 – 13 d	0.7 – 6.3 pmol/L		All	17 – 60 ng/L	
1 – <12 m	0.9 – 6.5 pmol/L			(1.8 – 6.4 pmol/L)	
1 – 10 y	1.2 – 6.3 pmol/L		*conversion factors:* *1 ng/L = 0.106 pmol/L* *1 pmol/L = 9.43 ng/L*		
11 – 18 y	1.6 – 7.2 pmol/L				
≥ 19 y	1.6 – 6.9 pmol/L				