

# Laboratory Medicine Bulletin

## Change in Normal Ranges

### Sex Hormone Binding Globulin and Bioavailable Testosterone

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Siemens has recently recalibrated its Sex Hormone Binding Globulin (SHBG) assay against the 1st World Health Organization International Standardized Reference material (WHO IRP 95/560). This has led to a significant increase in the values obtained for SHBG on the Immulite 2500 instrument used at St. Paul's Hospital. Reassignment of normal ranges for both SHBG and calculated bioavailable testosterone (CBAT) is necessary. These are based on literature for the pediatric and adult female populations (1), and on a combination of in-house studies and literature for the adult male population (2) employing Altman's approach for determination of age-dependent reference values (3). The new reference intervals for SHBG are as follows:

Males SHBG		
Age (y)	Lower (nmol/L)	Upper (nmol/L)
0-<2	1	110
2-<4	30	124
4-<6	41	168
6-<8	22	129
8-<10	42	149
10-<12	See Below	
12-<14	See Below	
14-<16	See Below	
16-<18	See Below	
18-<21	6	53
21-<61	12	78
61-<71	18	76
71-150	24	90

Females SHBG		
Age (y)	Lower (nmol/L)	Upper (nmol/L)
0-<2	1	72
2-<4	37	153
4-<6	25	113
6-<8	33	137
8-<10	29	145
10-<12	See Below	
12-<14	See Below	
14-<16	See Below	
16-<18	See Below	
18-<21	24	136
21-<31	18	358
31-<41	23	184
41-<71	18	136
71-150	45	175

Tanner Stage	Lower (nmol/L)	Upper(nmol/L)
I	40	131
II	41	164
III	21	120
IV	13	88
V	19	89

Tanner Stage	Lower (nmol/L)	Upper(nmol/L)
I	35	128
II	33	140
III	20	122
IV	17	100
V	20	107

The new normal ranges for CBAT are:

Males		
Age	Lower (nmol/L)	Upper (nmol/L)
19-<30 y	3.1	19.6
30-<40 y	2.9	14.9
40-<50 y	2.7	11.6
50-<60 y	2.4	9.7
60-<70 y	2.3	8.9
70-<80 y	2.2	8.7
80-<90 y	2.1	8.8
>90 y	>2	NA

Females	
Age	Lower (nmol/L)
>=19y	<1

Users are reminded that in adult populations, the appropriate use of bioavailable testosterone testing is for the investigation of hypogonadism in men and hyperandrogenism in women.

Normal ranges for CBAT in pediatric populations have not been determined. Should you have any questions, please do not hesitate to contact either of us at 604 809 8919.



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#### References

1. Elmlinger MW, Kuhnel W, Wormstall H, Doller PC. Reference intervals for testosterone, androstenedione and SHBG levels in healthy females and males from birth until old age. Clin Lab. 2005;51:625- 632.
2. Teoh YP, Wallace AM. Population reference ranges for plasma testosterone and calculated free testosterone in older men. Endocrine Abstracts 2006;12:104.
3. Altman DG. Construction of age related reference centiles using absolute residuals. Stat Med. 1993;12:917-924.