

Monica Idika  
Service Delivery Manager  
Tissue Sciences  
Synnovis Analytics  
St Thomas' Hospital  
London SE1 7EH

**Update to the WHO lower reference values (LRV) in human semen analysis from January 2024.**

Dear all,

Please read the information below carefully as it affects future semen analysis results for your patients.

You may be aware that the World Health Organisation have updated their laboratory guide on the analysis of human semen (2021). Among these updates are an expansion in the dataset used to produce the lower reference values (LRV) for sperm cells in the routine analytical categories such as motility, concentration and morphology [1]. Below you will find the values in the latest 6<sup>th</sup> edition [2]. Andrology labs should adhere to best practice, and this is usually laid out by the WHO. As such, we at Synnovis Cytology department will be updating our LRV.

The standard practice for a laboratory LRV is to use the lower fifth centile. The fifth centile column has been highlighted in the image below.

|  | N    | Centiles |     |           |      |      |      |      |      |      |        |
|--|------|----------|-----|-----------|------|------|------|------|------|------|--------|
|  |      | 2.5th    | 5th | (95% CI)  | 10th | 25th | 50th | 75th | 90th | 95th | 97.5th |
| Semen volume (ml)                                  | 3586 | 1.0      | 1.4 | (1.3-1.5) | 1.8  | 2.3  | 3.0  | 4.2  | 5.5  | 6.2  | 6.9    |
| Sperm concentration (10 <sup>6</sup> per ml)       | 3587 | 11       | 16  | (15-18)   | 22   | 36   | 66   | 110  | 166  | 208  | 254    |
| Total sperm number (10 <sup>6</sup> per ejaculate) | 3584 | 29       | 39  | (35-40)   | 58   | 108  | 210  | 363  | 561  | 701  | 865    |
| Total motility (PR + NP, %)                        | 3488 | 35       | 42  | (40-43)   | 47   | 55   | 64   | 73   | 83   | 90   | 92     |
| Progressive motility (PR, %)                       | 3389 | 24       | 30  | (29-31)   | 36   | 45   | 55   | 63   | 71   | 77   | 81     |
| Non-progressive motility (NP, %)                   | 3387 | 1        | 1   | (1-1)     | 2    | 4    | 8    | 15   | 26   | 32   | 38     |
| Immotile spermatozoa (IM, %)                       | 2800 | 15       | 20  | (19-20)   | 23   | 30   | 37   | 45   | 53   | 58   | 65     |
| Vitality (%)                                       | 1337 | 45       | 54  | (50-56)   | 60   | 69   | 78   | 88   | 95   | 97   | 98     |
| Normal forms (%)                                   | 3335 | 3        | 4   | (3.9-4.0) | 5    | 8    | 14   | 23   | 32   | 39   | 45     |

Figure 1: "Distribution of semen examination results from men in couples starting a pregnancy within one year of unprotected sexual intercourse leading to a natural conception. From Campbell et al. (5); fifth percentile given with variability (95% confidence interval)" - extracted from the 6<sup>th</sup> edition of WHO lab manual for examination and processing of human semen (2021). The 5<sup>th</sup> centile used for LRV has been highlighted in red.

This will of course mean that some results that would have fallen onto one side of the LRV will now fall on the other.

It is important to understand that, as mentioned in the WHO, this centile does not represent a limit of fertility but is a point in the distribution of results from fertile men achieving conception within a year.

If further clarification is needed please call the Cytology laboratory on 0207 1882904.

References:

1. Campbell MJ, Lotti F, Baldi E, Schlatt S, Festin MP, Bjorndahl L et al. Distribution of Semen Examination Results 2020 - a follow up of data collated for the WHO semen analysis manual 2010. Andrology. 2021
2. WHO laboratory manual for the examination and processing of human semen, sixth edition. Geneva: World Health Organization; 2021