



## Andrology Lab Corner

# Semen Analysis: Setting Standards for the Measurement of Sperm Numbers<sup>\*</sup>

LARS BJÖRND AHL AND CHRISTOPHER L. R. BARRATT

*From the Assisted Conception Unit, Birmingham Women's Hospital and Reproductive Biology and Genetics Group, School of Medicine, University of Birmingham, Birmingham, United Kingdom.*

Correspondence to: Professor Christopher Barratt, Assisted Conception Unit, Birmingham Women's Hospital, Metchley Park Road, Birmingham B15 2TG, United Kingdom (e-mail: [c.l.barratt@bham.ac.uk](mailto:c.l.barratt@bham.ac.uk)).

Received for publication September 29, 2004; accepted for publication September 29, 2004.

Recently several authors have highlighted the need for rigorous quality control as a basis for high-standard quality assurance in the andrology laboratory ([Björndahl et al, 2004](#); [Keel, 2004](#)). One aspect of quality assurance is selection and validation of appropriate techniques and equipment. Accurate determination of sperm concentration is crucial for the correct diagnosis of the male and the effective delivery of a sensible treatment plan.

A large number of different techniques to estimate sperm concentration have been reported. In the mid-1990s a series of fixed-depth disposable slides were evaluated as rapid and effective pieces of equipment for the estimate of sperm concentration. Preliminary data from a number of studies suggested that, at least in the 20- $\mu$ m-depth format, such chambers resulted in a noticeable underestimate of sperm concentration compared to the gold standard (improved Neubauer hemocytometer). Using this information, the World Health Organization stated that "such chambers, whilst convenient in that they can be used without dilution of the specimen, may lack the accuracy and precision of the haemocytometer technique" ([World Health Organization, 1999](#)). Further data—for example, from Tomlinson and colleagues—showed that 2 proprietary disposable slides (Microcell, Conception Technologies, San Diego, Calif; Leja, Leja Products, BV Nieuw-Vennep, The Netherlands) gave lower sperm concentrations compared to the hemocytometer method ([Tomlinson et al, 2001](#)). Consistent with these observations were reports from the American Association of Bioanalysts proficiency testing program ([Keel et al, 2000](#)) and the Study for the Future Families Research Group (Brazil et al, [2004a, b](#)).

In two papers in the current issue, Douglas-Hamilton and colleagues (Douglas-Hamilton et al, [2005a, b](#)) provide an advanced theoretical model to explain the lower results obtained using 20  $\mu$ m fixed-depth disposable slides and provide experimental data verifying their predictions. In

### This Article

- ▶ [Full Text \(PDF\)](#)
- ▶ [Alert me when this article is cited](#)
- ▶ [Alert me if a correction is posted](#)

### Services

- ▶ [Similar articles in this journal](#)
- ▶ [Similar articles in PubMed](#)
- ▶ [Alert me to new issues of the journal](#)
- ▶ [Download to citation manager](#)

### Citing Articles

- ▶ [Citing Articles via HighWire](#)
- ▶ [Citing Articles via Google Scholar](#)

### Google Scholar

- ▶ [Articles by Björndahl, L.](#)
- ▶ [Articles by Barratt, C. L. R.](#)
- ▶ [Search for Related Content](#)

### PubMed


- ▶ [PubMed Citation](#)
- ▶ [Articles by Björndahl, L.](#)
- ▶ [Articles by Barratt, C. L. R.](#)

addition, the model explains why 100-µm-deep chambers (improved Neubauer hemocytometer) are not significantly influenced by the Segre-Silberberg effect and thus are not prone to the errors occurring in thin capillary-loaded slides.

The explanation provided by Douglas-Hamilton and colleagues (Douglas-Hamilton et al, [2005a,b](#)) may allow "compensation factors" to be applied to sperm concentration data produced using thin capillary-loaded slides. However, the authors are correct in their conclusions that "these findings re-affirm the need to critically assess new technologies for accuracy, repeatability and precision."

In view of the above, the use of 20-µm thin capillary-loaded slides for the determination of sperm concentration is not compatible with the requirement for high-standard quality assurance in the andrology laboratory.

**Footnotes**

\* *Andrology Lab Corner* welcomes the submission of unsolicited manuscripts, requested reviews, and articles in a debate format. Manuscripts will be reviewed and edited by the Section Editor. All submissions should be sent to the *Journal of Andrology* Editorial Office. Letters to the editor in response to articles as well as suggested topics for future issues are encouraged. 

**References**

Björndahl L, Tomlinson MJ, Barratt CLR. Raising standards in semen analysis: professional and personal responsibility. *J Androl.* 2004; 25:862-863. [\[Free Full Text\]](#)

Brazil C, Swan SH, Drobnis EZ, Liu F, Wang C, Redmon JB, Overstreet JW. Standardized methods for semen evaluation in a multicentre research study. *J Androl.* 2004a; 25:635-644. [\[Abstract/Free Full Text\]](#)

Brazil C, Swan SH, Tollner CR, Treece C, Drobnis EZ, Wang C, Redmon JB, Overstreet JW. Quality control of laboratory methods for semen analysis in a multicentre research study. *J Androl.* 2004b; 25:645-656. [\[Abstract/Free Full Text\]](#)

Douglas-Hamilton DH, Smith NG, Kuster CE, Vermeiden JPW, Althouse GC. Particle distribution in low volume capillary-loaded chambers. *J Androl.* 2005a; 26:107-114. [\[Abstract/Free Full Text\]](#)

Douglas-Hamilton DH, Smith NG, Kuster CE, Vermeiden JPW, Althouse GC. Capillary-loaded particle fluid dynamics: effect on estimation of sperm concentration. *J Androl.* 2005b; 26:115-122. [\[Abstract/Free Full Text\]](#)


Keel BA. How reliable are results from the semen analysis? *Fertil Steril.* 2004; 82:41-44. [\[Medline\]](#)

Keel BA, Quinn P, Schmidt CF Jr, Serafy NT Jr, Serafy NT Sr, Schalue TK. Results of the American Association of Bioanalyst National proficiency testing programme in andrology. *Hum Reprod.* 2000; 15:680-686. [\[Abstract/Free Full Text\]](#)

Tomlinson MJ, Turner J, Powell G, Sakkas D. One-step disposable chambers for sperm concentration and motility assessment: how do they compare with the World Health Organisation's methods? *Hum Reprod.* 2001; 16:121-124. [\[Abstract/Free Full Text\]](#)

World Health Organization. *WHO Laboratory Manual for the Examination of Human Semen and Sperm-Cervical Mucus Interaction.* 3rd ed. Cambridge, United Kingdom: Cambridge University Press; 1999 .

This article has been cited by other articles:



## Reproduction

HOME

L. Lefievre, K. Bedu-Addo, S. J Conner, G. S M Machado-Oliveira, Y. Chen, J. C Kirkman-Brown, M. A Afnan, S. J Publicover, W C. L Ford, and C. L R Barratt

Counting sperm does not add up any more: time for a new equation?

Reproduction, April 1, 2007; 133(4): 675 - 684.

[\[Abstract\]](#) [\[Full Text\]](#) [\[PDF\]](#)

This Article

[Full Text \(PDF\)](#)  
[Alert me when this article is cited](#)  
[Alert me if a correction is posted](#)

Services

[Similar articles in this journal](#)  
[Similar articles in PubMed](#)  
[Alert me to new issues of the journal](#)  
[Download to citation manager](#)

Citing Articles

[Citing Articles via HighWire](#)  
[Citing Articles via Google Scholar](#)

Google Scholar

[Articles by Björndahl, L.](#)  
[Articles by Barratt, C. L. R.](#)  
[Search for Related Content](#)

PubMed

[PubMed Citation](#)  
[Articles by Björndahl, L.](#)  
[Articles by Barratt, C. L. R.](#)