Noninvasive Methods for Haemoglobin Screening in Prospective Blood Donors

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Background and Objectives
The haemoglobin level of prospective blood donors is usually performed on blood obtained by from the finger pulp by fingerstick with a lancet and filling a capillary tube with a sample. New noninvasive methods are now available for rapid, noninvasive predonation haemoglobin screening.

Materials and Methods
Prospective blood donors at our blood centre were tested, in two different trials, as follows: by the NBM 200 (OrSense) test (n = 445 donors) and by the Pronto-7 (Masimo) test (n = 463 donors). The haemoglobin values of each trial and the haemoglobin of finger pulp blood obtained by fingerstick with a lancet (HemoCue) were compared with the haemoglobin values obtained from a venous sample on a Cell Counter (Beckman Coulter).

Results
Comparison of Beckman Coulter Cell Counter and OrSense and results showed a bias of 0·29 g/dl, the standard deviation of the differences (SDD) of 0·98 and 95% limits of agreement from -1·64 to 2·21, using Bland and Altman statistical methodology. Comparison of Masimo and Beckman Coulter Cell Counter results showed a bias of -0·53 g/dl, SDD of 1·04 and 95% limits of agreement from -2·57 to 1·51. Cumulative analysis of all 908 donors, as tested by the usual fingerstick test showed a bias of 0·83 g/dl, SDD of 0·70 and 95% limits of agreement from -0·54 to 2·20 compared with the Coulter Cell Counter. Compared with the Coulter Counter, the specificity of the methods was 99·5% for fingerstick, 97% for OrSense and 83% for Massimo, and the sensitivity was 99, 98 and 93%, respectively.

Conclusions
Analysis of finger pulp blood by either direct sampling by fingerstick and Hemocue, or by noninvasive haemoglobin tests does not replicate the results of cell counter analysis of venous samples. Compared with fingerstick, noninvasive haemoglobin tests eliminate pain and reduce stress, but have a lower level of specificity and sensitivity