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The impact of noninvasive, capillary, and venous hemoglobin screening on donor deferrals and the hemoglobin content of red blood cells concentrates: a prospective study.

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BACKGROUND: Hemoglobin (Hb) is screened before whole blood donation to protect donors from anemia. Recently, noninvasive methods have become available for Hb screening in blood donors. We compared a noninvasive, a capillary, and a venous method for Hb screening of blood donors.

STUDY DESIGN AND METHODS: Consecutive donors were prospectively screened using a noninvasive (Masimo Pronto-7), a capillary (HemoCue Hb 301), and a venipuncture-based method as gold standard (Siemens Advia 2120i) for Hb determination. All measurements were performed in parallel and in duplicate. A cutoff Hb value of 125 g/L (females) and 135 g/L (males) was used for donor acceptance.

RESULTS: A total of 553 donors were analyzed; in 38 donors (7%) the noninvasive Hb method was not applicable due to technical reasons. The noninvasive test underestimated (mean bias, -5.9 g/L; 95% limits of agreement, -25.74, 13.88) and the capillary test overestimated Hb values (mean bias, 4.3 g/L; 95% limits of agreement, -8.13, 16.71). Coefficients of variation of duplicate measurements were 1.05 (venous), 2.73 (noninvasive), and 3.23 (capillary). The noninvasive test revealed false low Hb values in 21.2% and the capillary test revealed false high Hb values in 9% of donors compared to the venous method. The negative predictive value of the noninvasive test was 94.3%.

CONCLUSION: The noninvasive Hb measurement is a reasonable first-line approach for predonation Hb screening of blood donors but a second method should be available to retest those not testable with the noninvasive device or with Hb values below the cutoffs.