

## Methods to measure Haemoglobin in field conditions.

**Professor Umberto D'Alessandro and Dr. Filip Moerman** [*Institute of Tropical Medicine, Antwerp, Belgium*]

Having simple and reliable methods for the diagnosis of anaemia in a rural setting is important, taking into account the high prevalence of anaemia in third world countries. In recent decades many tools have been developed to assess haemoglobin (Hb); using spectrophotometry as a golden standard, they were established as more or less reliable, easy to use in the field conditions and cheap to distribute to poor primary health care settings. We shall discuss in short the two techniques that are currently considered as those best adapted for the purpose of research and rapid (though correct) clinical Hb assessment: the undiluted Lovibond method and the WHO new colour scale ('modified Tallqvist method').

The *Lovibond undiluted method* for Hb measurement compares the colour of whole blood with colour standards on pre-designed discs. The correct Hb concentration is then extrapolated from the nearest corresponding value on the disc. This method's most interesting merit is its good reliability (in terms of sensitivity, specificity and predictive values) even in basic conditions. Its performance is somewhat less accurate for the lower Hb values. Both, in evaluating Hb and in screening patients, the undiluted Lovibond has proven to be an excellent method. Indeed, it enables to measure small differences in Hb (up to 1 g/dl). Furthermore, it is very simple to use and it is not expensive; However, the latter depending on the lifetime of the instrument. In ideal circumstances it can last 4 years; and in that case the price of about 500 US\$ is acceptable. Nevertheless, this remains still more expensive than the WHO new colour scale.

Furthermore, the use of 'cuvettes' makes the device to a rather fragile one if circumstances are basic.

*WHO's new Hb colour scale* comprises a small card with six shades of red that represent Hb levels at 4,6,8,10,12 and 14 g/dl respectively. After placing a drop of blood on a provided test strip, one waits 30 seconds (but no longer than 2 minutes) after which the colour of the blood spot is matched against one of the hues of the scale.

This new technique is very reliable, albeit with some reserve for the higher Hb values; moreover, it cannot measure values above 14 g/dl. It has been tested for several purposes.

Repeatability, sensitivity and specificity are excellent and the device is cheap (about 20 US\$ for 1000 tests). Nevertheless, using the technique with good reliability requires a sound training beforehand. Moreover, the technique is not able to identify minor changes (1 to 2 g/dl) in Hb during treatment or in-between two subsequent measurements for example. This could be a disadvantage if the researcher wants to reveal small changes in Hb or to conclude that inclusion criteria are being fulfilled.

In *summary* we can say that both methods are reliable in field conditions and relatively easy to use. The undiluted Lovibond technique has already proven to perform well, there where the usefulness of large-scale distribution of the new colour scale has not yet been established. The scale is available for purchase by the end of June 2001.