Measuring and estimating the intravascular compartment volume

Estimating the blood volume on the basis of the measured plasma volume
With albumin-bound tracer, you can arrive at the plasma volume.
If you also know the hematocrit, you can calculate the blood volume (it consist of cells and plasma)
This means there is no need to measure the volume of the red cells.
The problem is, which hematocrit to use?

![Formula]

Whole body hematocrit = 0.91 x venous hematocrit

Which hematocrit is the right one to measure?

Venous hematocrit is higher.
Red cells in vein are bloated with the products of carbon dioxide transport, which is osmotically active, and causes them to swell.
According to Brandis,

Laboratory hematocrit is higher
Red cells in the measuring tube are trapped together with some plasma. That plasma goes unmeasured. Hence, hematocrit is overestimated.

Capillary hematocrit is lower
In the capillaries, axial streaming results in the separation of red cells and plasma. The hematocrit of capillary blood is thus about 0.20.

Measuring the blood volume

$^{53}$Cr labelled red cells are transfused.
They are restricted to the vascular volume.
$^{131}$I (radioactive iodine) can be used simultaneously to measure the plasma volume.
Thus, hematocrit is omitted from this calculation.

From Ganong's Review of Medical Physiology 23rd edition, Vanders Renal Physiology 7th edition, Wests Respiratory Physiology: the Essentials, as well as public works by the eminent Dr Kerry Brandis to whom I owe much of the inspiration for my shambolic efforts at self-education.