Discontinuation of calculated TIBC and UIBC, and change in grading status for percent Iron Saturation

The evaluation for iron deficiency or overload may be diagnosed by measuring or calculating several analytes. These analytes may include serum iron, total iron binding capacity (TIBC) or unsaturated iron binding capacity (UIBC) or serum transferrin (TRF), percent transferrin saturation (TS%, percent iron saturation), and ferritin.

Many participants determine TIBC (49%) and UIBC (19%) from calculations (TIBC = UIBC + serum iron concentration). There are a number of sources of error that can affect the TIBC/UIBC measurement. For example, TIBC is routinely determined by introducing a known amount of iron into the sample to saturate TRF, removal of unbound iron followed by measurement of “bound” iron disassociated from TRF. Sources of error in this measurement include iron contamination, method differences for removing unbound iron, the presence of other iron binding proteins, and variation in calibrators and controls.

A second calculation uses the TRF concentration and a conversion factor (CF, i.e. TIBC = TRF concentration x CF). The CF is determined from the atomic weight of iron, the binding of two atoms of iron per molecule of TRF, and the molecular weight of TRF (range 75,000 to 83,000). The range of molecular weights for TRF account for many different CFs (and three peer groups) in the C Survey. Due to the numerous methods available for measuring iron, the lack of standardization of calibration materials, and the variability in using a CF the Chemistry Resource Committee has determined that **calculated** TIBC and UIBC results will be removed from the survey as the individual components of the calculation are already graded within their respective method/instrument peer group.

Test results from TIBC, UIBC, or TRF are used to calculate TS%. In most cases, participants are calculating the TS% directly from either TIBC or UIBC (79%), where as the remaining participants (21%) use a CF and the TRF concentration to estimate TIBC for use in the calculation. As described above, the CF is derived from the relationship between serum TRF and TIBC, which in not entirely linear due to the binding of iron to other proteins. The different CFs used in determining TIBC has led to different method peer groups. Since the TS% is a calculated result from analytes (TIBC, UIBC, or TRF) that have already been graded, grading the calculation is not necessary. In fact, depending on a participant’s results, it is possible that peer group grading is acceptable and the calculation unacceptable. Thus, the Chemistry Resource Committee has decided to only grade the calculated TS% for **educational** purposes. Participants are encouraged to continue using the educational grading to assess the status of their method/calculation.

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