

DAY-TO DAY, WEEK-TO-WEEK, AND DAY-OF-WEEK VARIATION IN TESTS OF ANEMIA AND IRON STATUS IN HEMODIALYSIS PATIENTS

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To make informed decisions in dosing ESA and IV iron therapy, clinicians must determine whether differences between current and previous test results for anemia and iron status markers reflect expected variability or an actual trend. Because information on expected within-patient variability is lacking, we determined Hb, Hct, reticulocyte Hb (CHr: ret HE; Sysmex XE2100), TSAT and ferritin on 12 consecutive treatment days in 30 patients undergoing thrice-weekly hemodialysis.

We separately measured same-sample analytic variation and within-patient biologic variation (CV), then calculated the number of sampling days needed to determine the “true value” for each analyte with a 5% significance level and 80% power. Results are shown in the table.

	Hb	Hct	CHr	Tsat	Ferr	Hb
Analytic variation (%)	2.0	2.2	2.4	2.7	6.9	2.0
Biologic variation (%)	4.0	4.0	4.8	38.2	15.1	4.0
Sample days needed (n)	1	1	1	16	3	1

In addition, though Hb was the only analyte affected by draw day, levels obtained midweek averaged only 0.06 g/dL higher than those obtained the first dialysis day of the week ($p<0.05$).

Changes in anemia status can be reliably assessed by comparing two results for Hb or Hct. Similarly, changes in iron status can be reliably assessed by comparing 2 values of CHr. By contrast, our finding that at least 16 Tsat results and 3 ferritin results are needed to evaluate changes in iron status renders these analytes of limited utility in guiding iron dosing decisions within individual hemodialysis patients.