

DERVIATION OF DELTA CHECK LIMITS FOR OUTPATIENT COMPLETE BLOOD COUNTS (CBCs) ANALYZED ON MULTIPLE COULTER GEN S SYSTEMS IN A LARGE METROPOLITAN REFERRAL LABORATORY

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Introduction: Delta checking involves the calculation and evaluation of intra-patient differences (deltas) between serial measurements. A delta that exceeds a pre-defined limit is investigated. We have generated unique graphical summaries of intra-patient differences of the constituents of serially ordered CBCs measured by any one of four Coulter GenS systems in the only referral laboratory of a large northern Canadian city.

Methods: Over 3 months, a total of 178,000 outpatient specimens were analyzed and yielded 32,200 intra-patient CBC pairs. Three dimensional graphs were constructed showing frequency histograms of differences (deltas) between all possible intra-patient test pairs with the vertical axis representing frequency, and the other two axes representing the magnitude of the delta and the time interval (days) between the paired observations.

Results: The figure shows such a representative delta check graph for RDW. A linearly regressed border straddles both sides of the histogram (the 99% delta check limits for each week) and includes 99% of the positive and negative deviations. The table summarizes the within week 99% delta check limits for selected analytes for weeks 1, 2, 3 and 4. The MCV, RDW, and platelet delta check limits tend to increase with time. The other analytes demonstrate less variation.

Conclusions: We recommend the use of similar magnitude delta check limits in referral laboratories analyzing predominately outpatient specimens. If time dependent delta check limits cannot be implemented, use of the median might suffice.

	+99%Delta Check Limits			
Test	Week 1	Week 2	Week 3	Week 4
Hemoglobin, g/L	+24.6, -26.9	+25.6, -26.9	+26.6, -26.8	+27.5, -26.8
MCV, fL	+2.8, -2.9	+3.6, -3.3	+4.4, -3.7	+5.2, -4.1
RBC, 10 ¹² /L	+0.84, -0.94	+0.88, - 0.93	+0.93, -0.92	+0.97, - 0.91
RDW	+1.9, -1.5	+2.9, - 2.5	+4.6, - 3.2	+5.5, -4.1
Platelets, 10 ⁹ /L	+200, -150	+210, -190	+220, -220	+240, -250
WBC, 10 ⁹ /L	+9.2, -9.6	+8.8, - 9.0	+8.4, -8.5	+8.0, - 7.9
Neutrophils, 10 ⁹ /L	+7.0, -9.0	+7.2, -8.5	+7.4, - 8.1	+7.7, -7.6

RDW

