

DERIVATION AND COMPARISON OF COMPLETE BLOOD COUNT (CBC) DELTA CHECK LIMITS FOR 4 CITY HOSPITALS IN EDMONTON, CANADA

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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 various Coulter analyzers in 4 different hospitals in Edmonton, Canada.

Methods: Hematology laboratory data were obtained from a Mysys laboratory information system used by multiple hospitals in north-central Alberta including a quaternary care university hospital [UAH], a tertiary care city hospital [RAH] and two general hospitals, GNH and MH. Over 3 months, a total of 1,505,000, 1,011,000, 417,000, and 419,000 specimens were analyzed at UAH, RAH, GNH and MH, and yielded 39,000, 24,000, 7800, and 8100 CBC pairs, respectively.

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 delta check graph for a representative analyte, hemoglobin at UAH. A linearly regressed border straddles both sides of the histogram (the 99% delta check limits for each day) and includes 99% of the positive and 99% of the negative deviations. The table summarizes the within day 99% delta check limits for the four hospitals and selected analytes for day 0.

For most tests, there is little inter-hospital variation of the 99% delta check limits.

Conclusions: While the selection of delta check limits depends somewhat on the hospital environment, our limits probably can be used by most hospital laboratories.

		+99% Delta Check Limits		
Test	UAH	RAH	GNH	MH
Hemoglobin, g/L	-43.4, 38.7	-42.1, 38.6	-40.2, 43.5	-69.2, 72.3
MCV, fL	-3.50, 3.32	-2.35, 2.93	-2.62, 3.22	-2.65, 2.91
RBC, 10 ¹² /L	-1.44, 1.29	-1.40, 1.30	-1.35, 1.38	-1.33, 1.21
RDW	-1.80, 2.11	-1.95, 1.67	-1.73, 1.96	-1.78, 2.25
Platelets, 10 ⁹ /L	-161, 144	-178, 172	-507, 533	-125, 113
WBC, 10 ⁹ /L	-12.4, 12.9	-11.7, 10.7	-15.4, 16.6	-13.3, 15.5
Neutrophils, 10 ⁹ /L	-10.8, 11.3	-11.4, 11.9	-14.4, 17.3	-12.7, 14.2

University of Alberta Hospital: HB (numeric)

