Repeat Testing of Critical Laboratory Test Results

To the Editor.—Recent literature has explored the value of repeat testing of alert or critical laboratory test results, as illustrated in the article by Toll et al.¹ Using a large data set for selected tests, that article makes the point that repeat testing is rarely of value. All too often, laboratories retest results that are considered “critical” because of a purely emotional desire to avoid misleading a clinician into taking an action on that result, even though there is no scientific basis for retesting. The basic problem with such studies is an intrinsic bias in only retesting critical values to detect false-positive (α error) results. Because none of the noncritical specimens were retested to detect false-negative results, the β error is not evaluated. In other words, perhaps the patient really had a critical test result, but it was falsely noncritical.

A clinical laboratory must calculate and formally define the total analytic error (TEa)² at the measurement concentrations reflected by their critical values to properly determine whether a repeat result is statistically “different.” In this article,¹ the authors list their cutoff range for critical white blood cell concentration, hemoglobin concentration, platelet concentration, prothrombin time, and activated partial thromboplastin time, as well as declaring tolerance limits of undefined statistical origin for repeat runs (see their table 1). But the TEa is not rigorously, statistically defined by the authors and is likely set empirically. Further, the tolerance limits do not exactly correspond to the critical limits. For example, an initial platelet concentration result of 3000 is considered correct if the repeat run is as low as 1 or as high as 5999; this corresponds to a TEa of 100%. Few instrument manufacturers or hematology laboratories would consider those as satisfactory replicates. Reapplication of proper TEa-defined acceptability limits for repeat testing might increase the number of significantly different results and alter the conclusions of this study.

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