## PERFORMANCE CHARACTERISTICS OF SEVERAL RULES FOR SELF-INTERPRETATION OF PROFICIENCY TESTING DATA R. Neill Carey, PhD; George S. Cembrowski, MD; Carl C. Garber, PhD; Zohreh Zaki, MD

**Context:** Proficiency testing (PT) participants can interpret their results to detect errors even when their performance is acceptable according to the limits set by the PT provider. **Objective:** To determine which rules for interpreting PT data provide optimal performance for PT with 5 samples per event.

**Design:** We used Monte Carlo computer simulation techniques to study the performance of several rules, relating their error detection capabilities to (1) the analytic quality of the method, (2) the probability of failing PT, and (3) the ratio of the peer group SD to the mean intralaboratory SD. Analytic quality is indicated by the ratio of the PT allowable error to the intralaboratory SD. Failure of PT was defined (Clinical Laboratory Improvement Amendments of 1988) as an event when 2 or more results out of 5 exceeded acceptable limits. We investigated rules with limits based on the SD index, the mean SD index, and percentages of allowable error. **Results:** No single rule performs optimally across the range of method quality.

**Conclusions:** We recommend further investigation when PT data cause rejection by any of the following 3 rules: any result exceeds 75% of allowable error, the difference between any 2 results exceeds 4 times the peer group SD, or the mean SD index of all 5 results exceeds 1.5. As method quality increases from marginal to high, false rejections range from 16% to nearly zero, and the probability of detecting a shift equal to 2 times the intralaboratory SD ranges from 94% to 69%.