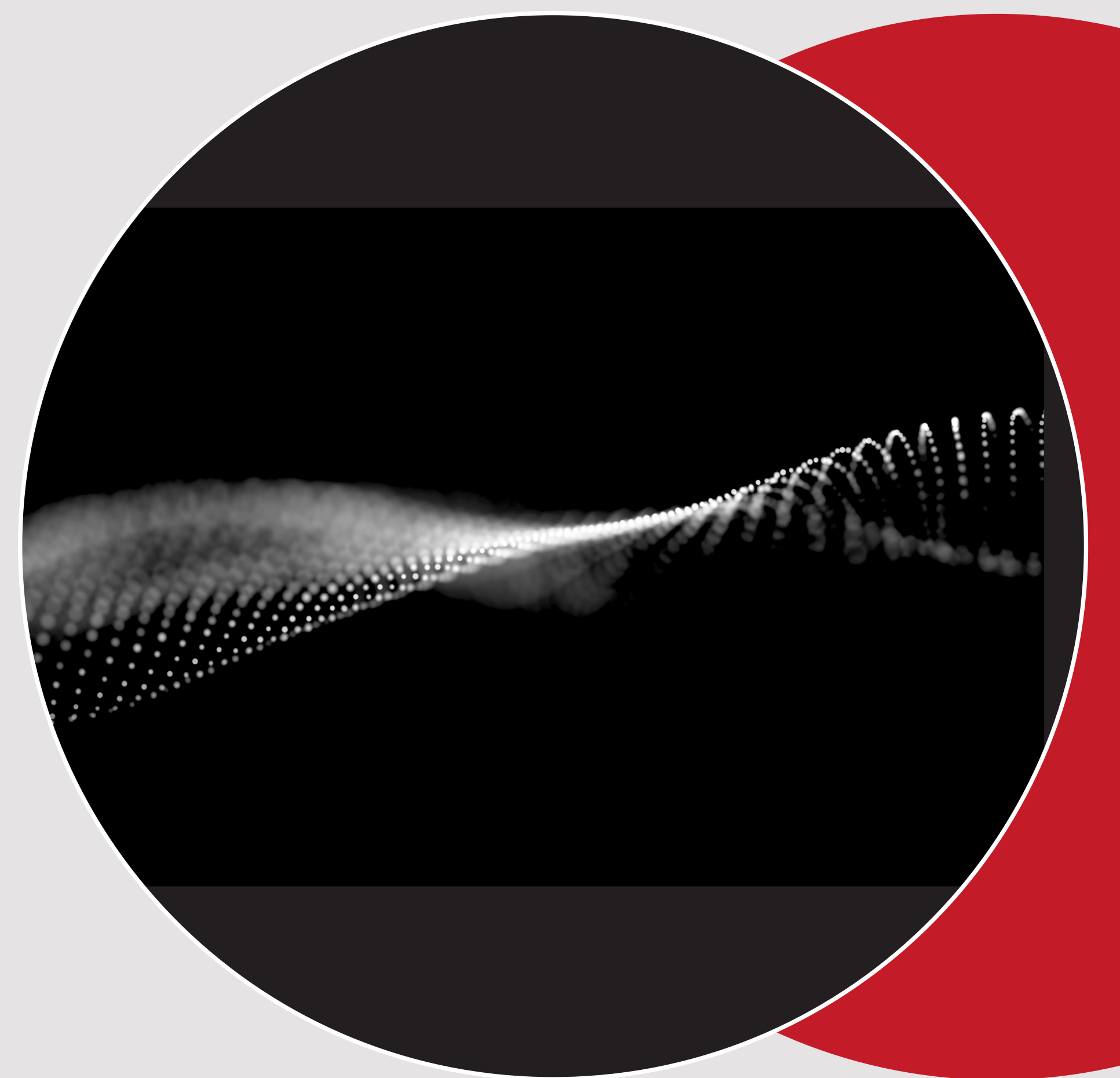


Observed Vs Desired EQA Performance – Z-Scores Vs APS

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Introduction

External Quality Assurance (EQA) providers commonly report z-scores to guide on assessment of results. Analytical Performance Specifications (APS), based on biological variation are another means of assessment. RCPAQAP introduced z-scores in addition to APS for quantitative survey reports in 2019.

z-scores are calculated using the mean and standard deviation of the submitted (observed) results and vary from survey to survey. While the 'Target' maybe based on a fixed reference method or median, APS ranges are consistent from survey to survey, regardless of the scatter of results; they can be set to drive the desired performance of a measurand. Based on the Milan Hierarchy, z-scores reflect the state of the art (Level 3) whereas APS's based on biological variation are at Level 2.1.

We sought to evaluate if a combination of z-scores and APSs provides the same or enhanced information on method performance.

Method

z-scores and APSs were reviewed for the 2020 and 2021 RCPAQAP General Serum Chemistry, Special Lipids, Endocrine and Liquid Chemistry programs. Trends (either where both "tracked" each other or diverged) were noted and further investigated.

Results & discussion

There were 3 main outcomes:

1. Acceptable APS (<1) / z-score (<2)

Where the EQA material was commutable, z-scores and APS's showed minimal differences (<1) for measurands that are traditionally performed well (both accurate and precise compared to a traceable fixed reference target (e.g. sodium, potassium, glucose).

2. Acceptable APS (<1) / z-score flag for review (>3):

Where an APS reflected clinical use and the majority of labs were precise, (so are measuring better than they need to) imprecision in an individual laboratory will flag relatively higher for z-score review, compared to APS (e.g. Triglyceride, Fig 1).

3. APS flag for review (>1) / z-score (<2):

Where there was bias and overall imprecision due to commutability differences between methods while z-scores were acceptable the related APS compared to all results/fixed target will flag for review (e.g. Vitamin D3, Fig 2).

Conclusion

The combination of z-scores and APS's for EQA performance assessment provides a balanced approach. z-scores still only reflect observed performance. Fixed APS's drive and maintain the desired performance of a method, particularly when the sample is commutable and a fixed target based on a reference/traceable method is applied. Laboratory staff need to understand the strengths and weaknesses of the two scores.

Reference

Jones G.R.D. Analytical performance specifications for EQA schemes-need for harmonisation. Clin Chem Lab Med 2015; 53(6): 919-924

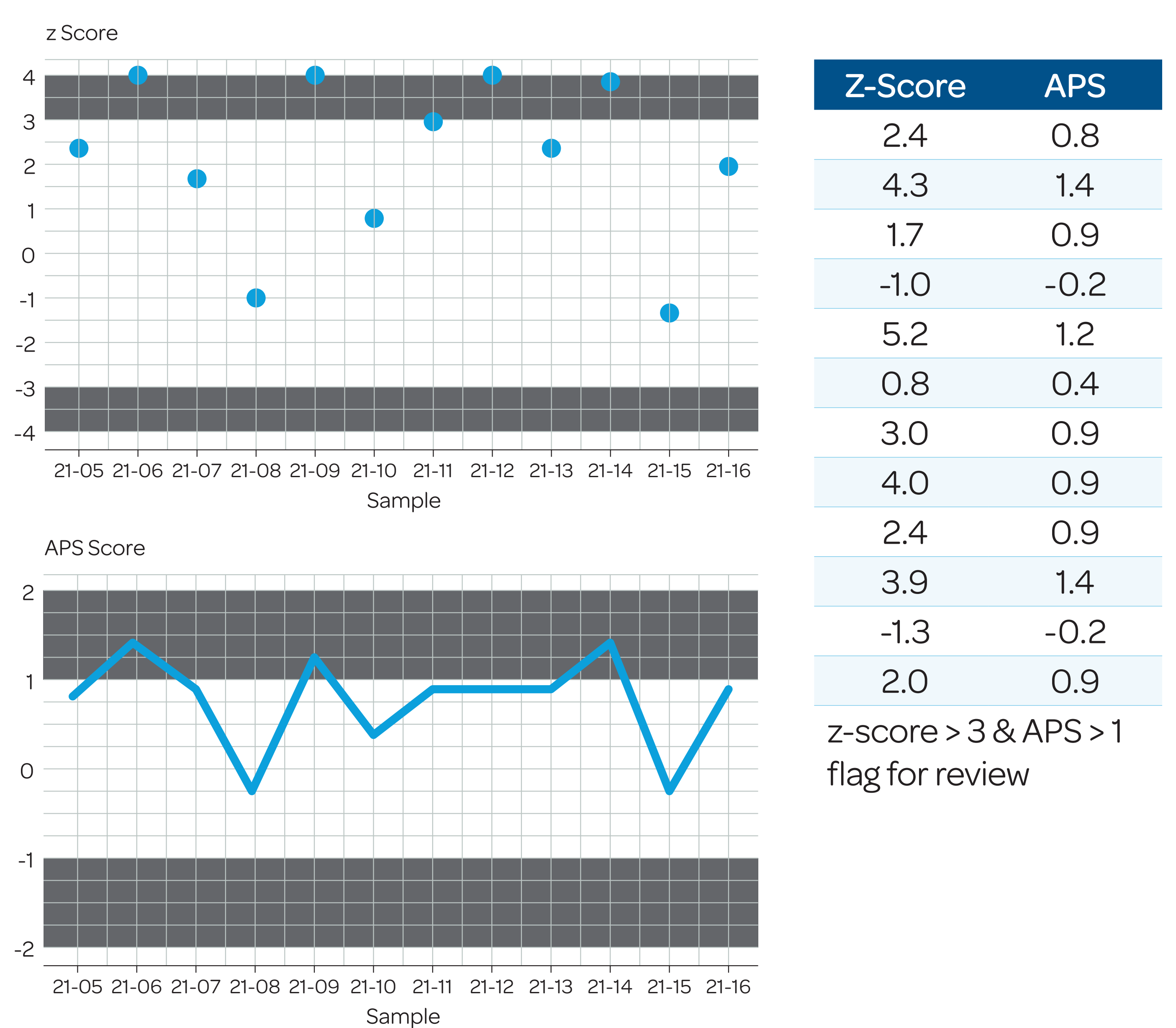


Figure 1. Triglyceride z-scores and APS's for a lab that is less precise than the overall CV.

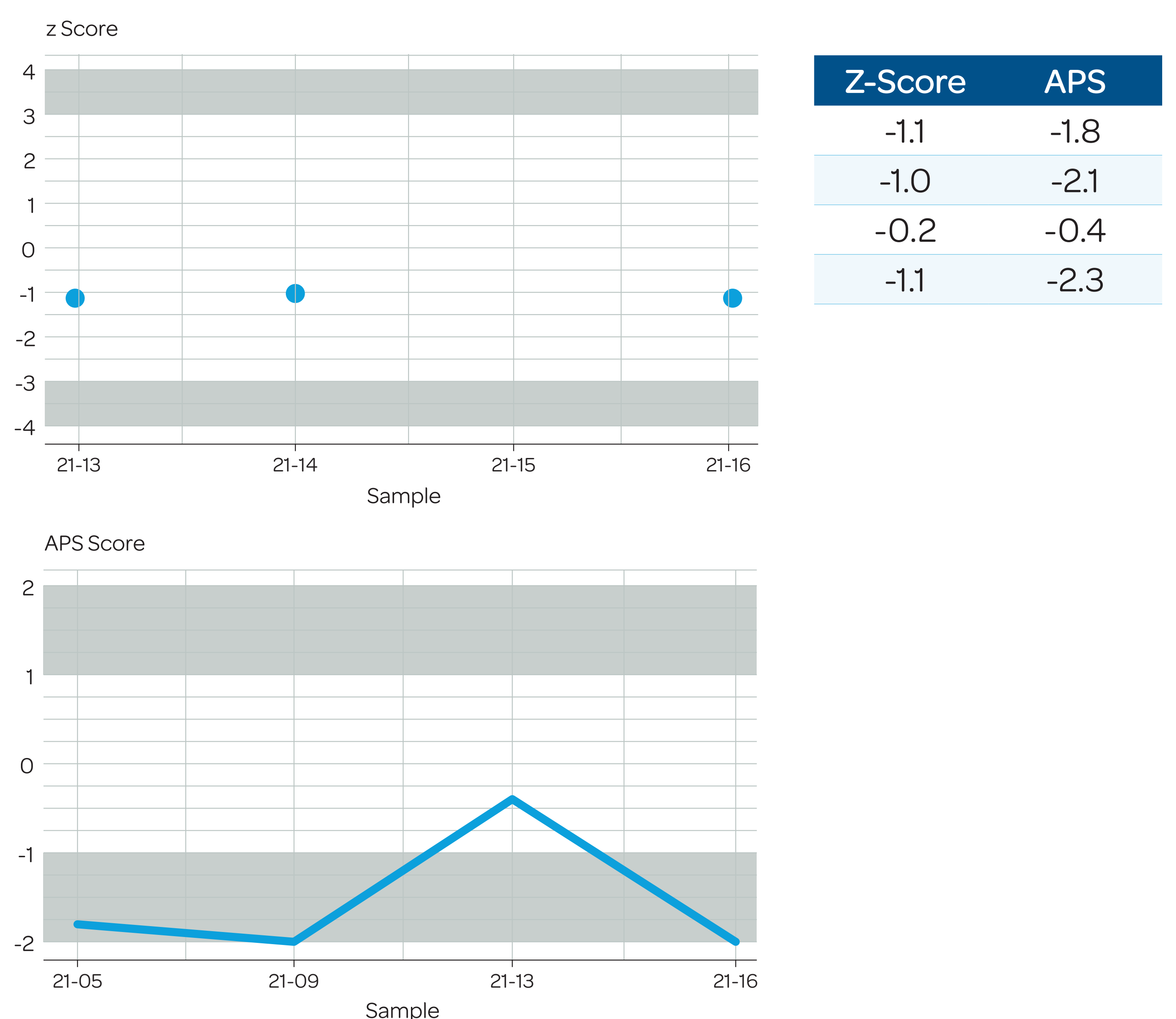


Figure 2. Vitamin D3 where bias due to commutability differences between methods give acceptable z-scores (<2) but will flag for APS review when compared to a fixed target.